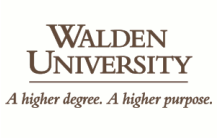

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Effects of Classroom Setting and Instructional Practices on Academic Performance

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Abstract

Effects of Classroom Setting and Instructional Practices on Academic Performance

by

Michele De Francesco

M.S. Loyola College, 1989

B.S. University of Maryland, 1986

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

General Education Psychology

Walden University

February 2016

Abstract

According to the National Center for Educational Statistics and the National Center for Educational Progress (NAEP, 2011), student with disabilities are not making significant academic gains compared to non-disabled student groups. The purpose of this study was to determine the impact of differentiating instruction specifically pre-teaching and re-teaching and whether or not a student has a disability with academic performance on the Maryland State Assessment (MSA) for eighth grade reading across 17 middle schools in Anne Arundel County. The theories of cognitive social learning, cognitive neuroscience and brain based learning grounded the quantitative quasi-experimental research using an ex post facto design based on archival data collected from September 2011 to January 2013 by the researcher and multiple observers from the secondary special education leadership team. A two-way analysis of variance (ANOVA) was utilized to determine if significant differences existed among the reading performance for students in schools where teachers differentiated instruction, and type of student. Results from the study demonstrate that students without disabilities continue to have higher scores than students with disabilities. It is recommended results from this study be shared with educators to expand the knowledge base of educators to assist with closing the achievement gap between students with and without disabilities.

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Table of Contents

Chapter 1: Introduction to the Study....1
Introduction....1
Purpose of the Study....6
Research Questions and Hypotheses....9
Operational Definitions....10
Theoretical and Conceptual Framework....12
Nature of the Study....14
Assumptions, Scope, Limitations, and Delimitations....16
Positive Social Change....18
Significance....20
Summary....21
Chapter 2: Literature Review....23
Introduction....23
Research Strategy....28
Theoretical Foundation....29
Reading Comprehension and Instruction....33
Universal Design and Instruction....34
Education and Students With Disabilities....37
Preteaching, Reteaching, and Formative Assessments....42
Preteaching and Reteaching Based on Student Performance....43

Summary and Conclusions 44
Chapter 3: Research Method....51
Introduction....51
Research Design and Rationale 55
Research Questions and Hypotheses: 57
Maryland State Assessment Analysis and Data....58
Setting and Population 60
Reliability and Validity....62
Materials and Procedures....65
Independent and Dependent Variables 67
Data Analysis....69
Threats to Validity 72
Ethical Considerations 73
Summary....74
Chapter 4: Results....76
Introduction....76
Data Collection 77
Study Results 79
Descriptive Statistics.... 80
Inferential statistics 86
Summary....87

Chapter 5: Discussion, Conclusions, and Recommendations 92

Introduction 92

Interpretation of the Findings 92

Limitations of the Study 99

Recommendations 100

Implications 104

Conclusion 107

References 110

Appendix A: Instructional Coaching Tool 117

Appendix B: Phase III Coaching Tool Feedback (Middle School) 119

Figures

1 DI status and type of student 80

2 DI status and MSA scores 81

3 MSA distribution of scores and type of student 82

Tables

1 Percentages of grade 8 students scoring advanced or proficient on MSA reading 57

2 Descriptive statistics 77

3 Tests of between subjects 84

Chapter 1: Introduction to the Study

Introduction

More than a decade ago, education was declared a national priority; however, most schools have remained unchanged. According to Wagner (2008), only one third of high school graduates are ready for college, and 40% of all students who enter college must take remedial classes. The current U.S. education system needs continued research to determine effective ways for teachers to implement lesson plans that prepare all types of learners to be college or career ready. According to the National Assessment of Educational Progress (NAEP), which provides the average reading assessment scores based on long-term trend data, the average reading scores for 13-year-olds showed only modest growth in 2008 and have not significantly improved since 1992.Furthermore, the assessment results for 17-year-old students are not measurably different from what they were in 1970.

In the field of education, people recognize the need to prepare general educators and special educators to meet the needs of students with disabilities and diverse learners. Cognitive and brain-based learning theories have become instrumental in special education efforts to improve student academic performance. Both describe teaching methods that require implicit and explicit instruction. These theories rely on developmental cognitive processes and the individual strengths, weaknesses, needs, and learning styles of students (Dever & Karabenick, 2011; Jensen, 2005; Kazu, 2009; Smith, 2007; Sousa, 2009; Wagner, 2008). The connection between how teachers differentiate

their instruction and whether or not a student has a disability in a general education class may lead to a viable solution to narrow the achievement gap between special education students and students without disabilities.

According to the Individual Disability Education Act (2004), *inclusion* refers to a commitment that all students will be educated in the least restrictive environment (LRE), or general education classes with nondisabled peers, to the maximum extent possible. Furthermore, the Individual Disability Education Act (IDEA) mandates inclusion, which challenges educators to differentiate their instruction in mainstream classes in a manner designed to meet the unique and individual learning needs of all students. Inclusion provides equal access to the curriculum to students with disabilities, which may result in higher achievement and promote social opportunities with their nondisabled peers. Nondisabled students also benefit from inclusion by developing greater understanding, tolerance, and acceptance of diversity (Ryan, 2006).

Neurocognitive psychology offers a framework with a multidimensional approach that emphasizes student cognitive learning styles and preferences (Jang, Deci, & Reeve, 2010). Kazu (2009) defined individual learning differences as facets of personality, perception, ability, and intelligence. For a teacher to both motivate and capitalize on the student's potential, the more precise and clearly expressed representation of what is to be learned, the explicit nature of teaching, requires an examination of students' preferred learning styles and preferences (Seifert, 2004). The research suggests that teacher practices that provide differentiated instruction based on student learning styles and

interests maximize achievement (Wormelli, 2006). Cognitive social learning (Bandura, 2002) and neurocognitive theories of learning (Jensen, 2005) suggest student motivation and academic performance are directly related to instructional practices that recognize individual student needs and learning styles. When developing an instructional design, an educator must (a) be mindful of how the content is structured for meaning, (b) possess knowledge of students as individuals, and (c) know which elements in the classroom allow for flexibility in delivering the lesson connecting content and learners.

Cognitive psychology and neurocognitive theories of learning acknowledge the importance of differentiated instruction. The main objective is to identify strengths and weaknesses in a student and provide specialized instruction to enable the student to learn effectively. Effective teachers must know the curriculum and their students, and that should determine instructional decisions (Kazu, 2009). For 25 years, nationwide test results have shown only modest growth with reading assessment scores in middle school (NAEP, 2011). Additionally, the United States has one of the largest gaps between high and low-performing students in an industrialized nation according to Program for International Student Assessment (2009). According to Nie and Lau (2010) this continues to be a concern because U.S. educators are not identifying how teachers' styles and instructional designs affect academic achievement. Educators who consider how students learn and incorporate different levels of instruction increase student learning outcomes (Smith, 2007). This study will examine how differentiating instruction impacts academic achievement for students with and without disabilities in order to enhance educational

research in the area with a goal of elevating all students and closing the achievement gaps.

All students in Grade 8 are required to take the reading Maryland State Assessment (MSA). Approximately 17,137 middle school students in Anne Arundel County, Maryland are in Grade 8, and 5,100 of these students receive special education services. Of the special education students who took the reading MSA in 2013, only 46.6% scored advanced or proficient compared to their general education peers who averaged 89.8%, demonstrating a significant gap in achievement.

Barnett (2011) found that teachers need to use data to measure student strengths and weaknesses to inform instruction as failure to do so can ultimately affect student achievement in reading comprehension. According to Clark (2005), inclusion works for all students, and its success is dependent on teacher instructional practices and the use of differentiated instruction based on individual student learning needs. Differentiated instruction strengthens students' self-determination skills to which helps build a foundation for learning beyond content-specific curriculum.

Special education is built upon the belief that all students can and will learn. It is the responsibility of all stakeholders (parents, administrators, districts, school boards, teachers, and so on) to provide appropriate learning experiences for all students that recognize and understand the unique nature of each student, promote each student's worth and dignity, and leads to educational success for every student (IDEA, 2004).

Differentiated instruction implies that teachers recognize barriers to learning, strategically plan, modify instruction, and use meaningful data to monitor student progress (Barnett, 2011). Differentiated instruction is giving all students what they need to access the curriculum, which may require specialized instruction that adds technical supports and incorporates specialized instruction through preteaching or reteaching that builds upon students' strengths as well as provides accommodations or modifications to enhance the learning process for all learners and increase overall achievement (Corno, 2008).

Differentiated instruction relies on preteaching and reteaching, which acknowledge that students' learn at different rates and in different ways. Preteaching and reteaching promote personal responsibility for learning and build feelings of competence and confidence in learning (Cash, 2011). Differentiated instruction provides a supportive classroom environment that promotes the acceptance of differences. Preteaching and reteaching involve strategies that enhance procedural memory, which may include physical activity, such as hands-on projects and the use of manipulatives. Teaching should apply both explicit and implicit learning strategies to enhance knowledge acquisition and retention (Wormelli, 2006). Priming is another technique that, through the use of preassessments, informs preteaching and reteaching. Priming the brain specifically helps students build on background knowledge and structure and stimulate their thinking (Wormelli, 2006).

Student populations today are more multicultural and diverse, requiring teachers to reconsider their instructional practices to differentiate for students' individual learning needs (Wagner, 2008). Student academic performance is dependent on environments that foster self-efficacy and acceptance of differences. Instruction that applies student-directed activities to instill self-determination and responsibility for learning enhances this (Jang et al., 2010). Simply providing students with disabilities access to the general education classes does not guarantee full acceptance or outcomes comparable to those of students without disabilities (Weiner, 2010). To adequately address the diverse learning needs and skills of students, universal design for learning (UDL) continues to challenge the research, moving from a focus on inclusion toward instruction that considers individual student learning needs and, in turn, challenges teachers to differentiate instruction for students with and without disabilities.

Purpose of the Study

The purpose of this study is to support the pedagogy of inclusion and differentiated instruction using preteaching and reteaching to improve academic achievement. The research examines the effect that differentiated instruction has on academic achievement in LRE for students with and without disabilities. To support the pedagogy of inclusion and differentiated instruction with academic performance, educators must share a vision and understanding that all children can learn and that instructional methods must be differentiated for learners through the use of preteaching and reteaching in order to narrow the achievement gap in reading between students with

and without disabilities. The use of preassessments and formative assessments provides evaluative data to inform instruction based on individual student strengths and weaknesses, which requires preteaching and reteaching for struggling learners (Barnett, 2011). Solheim (2011) found that teacher knowledge of the learning processes and brain-based research can impact teacher instructional practices and academic achievement. Inclusion does not mean watering down instruction; rather, it means teaching differently while expecting the same depth of knowledge (Clark, 2005).

The intent of this study is to demonstrate the effect of differentiated instruction (whether or not students receive preteaching and reteaching) and type of student (whether or not student has a disability) for students in cotaught classes as measured by performance on the MSA (dependent variable) in reading for Grade 8. Cotaught classroom settings feature two educators, a general educator and a special educator, to serve students with and without disabilities.

The independent variable, differentiated instruction (whether or not students get preteaching and reteaching), is defined as the provision of specialized instruction based on preassessments and formative assessments that engage students with different instructional strategies based on the student's level of mastery and provide specialized instruction as needed through modified content, methodology, or delivery. Differentiated instruction is categorized as whether or not students in cotaught classes receive preteaching and /reretaching. In this study, differentiated instruction has been categorized

based on the percentage of frequency in which cotaught classes preteach and reteach in each middle school as compared to the county mean average of 31%.

The second independent variable is type of student, whether or not a student has a disability. This independent variable is nominal, special education students or students without disabilities. Students with a disability are identified as those students who have a current Individual Educational Plan (IEP) as written through the special education process for those with an educational disability. Students without disabilities do not have an IEP or documented educational disability.

The dependent variable is performance on MSA for reading in Grade 8 and is based on a continuous scale in which scores are scaled according to state performance standards and reported as percentages based on the number of students who achieve basic, proficient, or advanced on the assessment. MSA performance was calculated by the number of students scoring at the proficient level in reading for eighth grade. MSA scores in Grade 8, which are based on a continuous scale, provide scaled scores for each student in reading comprehension with a minimum and maximum value. Continuous variables can have an infinite number of different values between two given points (Creswell, 2009).

The independent variable, differentiated instruction, relies on archival data the researcher participated in as part of a team consisting of 13 experts in the field of special education who developed an instructional coaching tool (Anne Arundel County Instructional Coaching Tool, Appendix A) designed to identify specific indicators related

to differentiated instruction in a cotaught classroom. The team conducted informal classroom observations using the instructional coaching tool from September 2011 through January 2013 in cotaught classes for 17 middle schools. The data for differentiating instruction was calculated based on a percentage of the frequency of use of preteaching and reteaching in cotaught classrooms in each of those schools and compared to the county overall average of 31%.

As student populations become more diverse, general and special educators will need to collaborate more extensively on ways to differentiate instruction to increase academic performance for all students. Collaborative planning encourages educators to use evaluative data that drives preteaching and reteaching, making the classroom student centered based on individual student needs (Corno, 2008). Differentiated instruction in the classroom acknowledges that all students do not learn the same way nor will they reach the same desired outcome at the same time (Kazu, 2009). It encourages ongoing assessment and evaluative measures to ensure students are learning, and if they are not, to preteach or reteach in a specialized or different manner (Barnett, 2011). The following research questions have been formulated to guide the study.

Research Questions and Hypotheses

Research Question 1: Is there a significant difference in reading performance on MSA for students when teachers use differentiated instruction?

$H_0$1: There is no difference in MSA performance in reading as a function of differentiated instruction.

H_a1: There is a significant difference in reading performance on MSA as a function of differentiated instruction.

Research Question 2: Is there a significant difference in MSA performance as a function of whether or not the student has a disability?

$H_0 2$: There is no difference in MSA performance as a function of whether or not the student has a disability.

$H_a 2$: There is a significant difference in MSA performance as a function of whether or not the student has a disability.

Operational Definitions

For the purpose of this research, variables and concepts are defined as follows:

Preteaching and reteaching is providing specialized instruction to students that require enhanced instruction to acquire background knowledge, vocabulary, or skills, necessary to understand concepts being presented. It also provides practice and reinforcement of the skills and learning objectives to ensure students have mastered the content before moving on with the lesson. Lessons may be modified or students are given accommodations to access the learning material. *Differentiated instruction* is determined based on a percentage of the frequency of use that a general educator or special educator provides preteaching/reteaching in cotaught classes. Differentiated instruction is based on preassessments or formative assessments that inform instruction which is specialized for individual student learning styles, interests, and assessed content performance. Students are grouped based on the formative assessment and engaged in specialized instruction as

needed through modified content, methodology, or delivery (Smith, 2007). The independent variable differentiated instruction is divided into two groups: (a) schools that are below the county average of 31% for frequency of use of preteaching and reteaching (not differentiating instruction), and (b) schools that exceed the county average of 31% for frequency of use of preteaching and reteaching (differentiating instruction).

Type of Student (whether or not student has a disability) is defined at the nominal level. Students with disabilities are special education students receiving special education services under an IEP. Students without disabilities do not have an IEP or documented educational disability. Special education students under IDEA (2004) have a documented educational disability requiring direct academic services from a special educator. The students with disabilities in this study were all working toward a high school diploma and received direct services for academic, attention, and/or emotional conditions that impacted academic performance and required direct service from a special educator to implement accommodations and/or modifications.

MSA performance is defined as state performance standards that identify levels for student achievement on the reading assessment for Grade 8. Performance is measured with cutoff scores that place students into three categories of performance: basic, proficient, or advanced. MSA performance is represented as a percentage for the number of students that score basic, proficient, or advanced in eighth grade reading.

Coteaching classroom is a classroom where two educators, a general educator and special educator having equivalent credentials, are partners in the instructional effort. The

general education curriculum provides the instructional framework with the flexibility of modifications based on the student's IEP.

Least Restrictive Environment (LRE) means that to the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities, are educated with children who are not disabled (IDEA, 2004, section 612a[5]).

Theoretical and Conceptual Framework

The theoretical framework for this study was Jensen's (2005) theory of cognitive neuroscience and Bandura's (2002) theory of self-efficacy and cognitive social learning with academic achievement. The framework offers guidance and understanding of how and why students learn. Cognitive psychology embraces neuroscience in the classroom and uses a multidimensional framework to acknowledge the significance of multiple intelligences, student-led instruction, differentiated instruction, and meaningful learning goals (Jang et al., 2010). Uncovering learning mechanisms that activate both affective and cognitive centers of the brain increases executive functions with learning styles that, in turn, increase student engagement and academic performance (Jensen, 2005).

Cognitive social learning theories have evolved from Vygotsky's historical perspective that acknowledged students would be at different points of readiness within the same classroom, which he termed the zone of proximal development (ZPD), (Alpay, 2003). Cognitive psychology contends that learning is an active process and a fluid reciprocal interaction of the student's and teacher's abilities to construct meaning from

multiple pathways. Sousa (2009) suggested that brain-based research provides mental models for a multidimensional approach that applies internal and external factors involving the accommodating and rethinking of instructional methods to emphasize individual student cognitive learning styles, the role of genetics, the influence of culture, and personal experiences. Students learn better and feel better about their selves when teachers diagnose their current skill level and modify their instruction and specific tasks appropriate for the student's skill level (Sousa & Tomlinson, 2011, p. 88). In addition to teachers looking carefully at preassessments and formative assessments, it is also important for teachers to ask students how they are feeling about a task to ensure differentiation of instruction is a collaborative effort (Sousa & Tomlinson, 2011, p. 88). Bandura (2002) imposed a social development theory that transformed thinking and practice into a collaborative experience of the individual and environment. Constructivism contends that learners are active participants in an active environment. Thus, Bandura (2002) provided a shift from a traditionalist perspective of teacher-led instruction to a fluid interaction between the teacher and student that facilitates constructed meaning and is reciprocal. If the goal is for students to learn, then educators need to provide specialized instruction to activate neural networks in the brain that tap into implicit and explicit emotional learning and memory (Jensen, 2005). Educators who consider how individual students learn employ a variety of techniques that strengthen memory to enhance learning (e.g., chunking material, grouping material into categories),

use various strategies, such as movement, and provide multiple opportunities that allow diverse learners to process the content (Jensen, 2005).

To promote academic competence in students, educators must reframe cognitive perceptions by differentiating instruction with content, process, and product through preteaching and reteaching to provide learning activities that engage students based on student preferences, interests, and learning styles (Corno, 2008). Learning is dependent on strong connections between past and new learning experiences to provide understanding and meaning (Klassen, 2010).

The literature review in Chapter 2 provides a more detailed analysis of a conceptual framework. This is designed to demonstrate that effective teaching and learning are strongly related to educator practices that model and instill positive self-concepts in students. These, in turn, increase motivation and academic achievement through the use differentiated instruction for all students.

Nature of the Study

The nature of this study was a quasiexperimental design in a natural setting. This research used an ex post facto design in which the subjects, students, are not randomly assigned in cotaught classes that practice differentiated instruction or those that do not. The participants in this study may or may not have received differentiated instruction, which was not controlled. This study used a comparison group in which students were not randomly assigned and there was a lack of physical control of the experimental situation. It was not determined which students would receive differentiated instruction

and which would not. The research used archival data collected using the instructional coaching tool in coteaching classes (special education teacher and general education teacher) across 17 middle schools, identifying the percentage of frequency of use in which schools used differentiated instruction, compared to the mean average of all middle schools in Anne Arundel County, Maryland, with MSA performance in reading. MSA performance was analyzed with use of differentiated instruction and whether or not students had a disability.

This quantitative analysis was designed to determine whether or not differentiated instruction makes a significant difference in helping narrow the achievement gap and increase academic performance for all students. This quasiexperiment allows the sampling procedure to be logistically feasible within a natural school environment. The research examined differentiated instruction and whether or not a student had a disability with performance on MSA. Students were scheduled in cotaught classes; therefore, this study was an ex post facto experiment in which students had already been placed in pre-existing groups. A two-way analysis of variance (ANOVA) was used in this study to examine the effect of differentiated instruction for eighth grade students from 17 middle schools on MSA performance. Data on the use of differentiated instruction was obtained using archival information collected through the instructional coaching tool made available from the Anne Arundel County school district. Chapter 3 will discuss in more detail the nature of the study and the data analysis.

Assumptions, Scope, Limitations, and Delimitations

The study assumed all students receiving special education services in cotaught classes had current IEPs at the time the MSA was administered. It also assumed that students were given the accommodations and supports outlined in their IEPs.

Vygotsky's theory affirms the scope of this study, which supports that students should be challenged to reach their fullest potential. Vygotsky's (1978) theory of ZPD provides a perspective that supports a connection among mental processes, social interactions, and cultural influences on learning. He demonstrated the importance of actively engaging the learner in the learning process and understanding differences across cultures to understand the "what" and "why" of an individual's thinking as it relates to cultural contents, conceptions, and perceptions of learning, as well the significant role the teacher has as a guide to monitor and facilitate the learning process. The challenge is that in any given classroom for any segment of content, students will be at various readiness levels, or ZDP points, and it is likely that some students may struggle with fundamental skills, yet understand the content. Neuroscientific studies have demonstrated that the brain's main job is to survive, and learning tasks outside their ZPD will produce stress. Students will fight or flight to avoid looking incompetent in front of their peers. The interdependence of the learning environment, curriculum, assessments, instruction, and classroom management as well as the leaner's mindset is tightly connected to teacher planning and implementation of differentiated instruction (Vallerand & Lalande, 2011).

Federal laws and policies have established new guidelines for students with disabilities (No Child Left Behind Act [NCLB], 2001, IDEA, 2009). These mandates require educators to re-examine belief systems and instructional practices for all types of learners to benefit academic achievement, employment, and citizenship.

Significant limitations to this study are that it was retrospective, it had many uncontrolled variables, and groups could not be randomly assigned for the convenience sampling. An additional limitation to this study was the reliance on special educators and general educators' expertise with preassessments and formative assessments. These limitations hinder generalizability of the results (Creswell, 2009). The social cognitive theory of motivation recognizes the importance of mental processes, the perception of how people learn, and self-efficacy, which is a function of a person's belief system and frame of reference (Bandura,2002). It suggests that internal, subjective experiences are related to beliefs, thoughts, and learning (Klassen, 2010).). However, the cognitive social theory cannot explain why test scores are low and has not prompted stakeholders to address how educators teach in a modern society. According to Jang et al. (2010), engaging students in learning activities requires autonomy, support, and structure. Differentiating instruction maximizes all students' potential by designing instruction based on student learning styles across content areas. It requires teachers to take different approaches for students some or much of the time. Redesigning how to teach students requires teachers to self-reflect and to reestablish intrinsic motivation by identifying personal learning goals and setting student learning goals (Ryan, 2006).

Educational systems have a responsibility to students in terms of achievement and student learning outcomes. Although teachers reshape brains daily through instructional practices, gaps in the literature still exist regarding the impact of nature and nurture as an explanation for learning and educational practices. Applying cognitive neuroscience in the classroom contributes to a societal paradigm shift that acknowledges learning as a combination of biology and environment (Jensen, 2006). Brain scanning is conducted in controlled settings, so data is still inconclusive for the application regarding mental processes connected to recall and memory within the natural classroom environment (Murphy and Benton, 2010). However, educators are an invaluable resource to provide data-driven information to cognitive neuroscientists for continued exploration and research.

Positive Social Change

Motivation for change requires a paradigm shift in teachers' perceptions and expectations away from the idea that all students should be expected to meet the same goals in the same way; instead, teachers need to implement differentiated instruction based on student ability, learning styles, and needs. Ferkany (2008) contended that motivation for change is dependent on belief systems and prior connections that may have induced positive or negative attitudes. Geary (2009) suggested learning requires a multidimensional approach. Studies on effective learning and teaching have demonstrated that motivation, engagement, and positive classroom climate enhance learning outcomes (Clark, 2005; Deci & Ryan, 2008; Nie &Lie. 2010; Dever & Karabenick, 2011). Self-

esteem is correlated to self-efficacy, which is critical to academic success (Phan, 2010). Bandura (2002) emphasized the importance of motivating teachers to address instruction via professional development opportunities and positive incentives for change. Bandura further suggested that to foster change requires supporting connections among social learning that examine teacher self-concepts both individually and collectively in order to reach outside negative belief patterns about their ability or need for change. To promote a social change in how we educate students, teachers need to experience success and connect their efforts to their classroom environment, belief systems, and internal and external motivators (Amiot & Sansfacon, 2011).

Hence, social change incorporates the evolution of education that encourages a multidimensional approach to teaching. Learning is connected to both behavior and the environment that is shaped by the changing needs of society's demands and problems. The history of education and the practice of psychology continue to challenge educators to critically examine cognitive social learning theories, self-esteem, and their relationship to educating students as well as the extent to which intrinsic and extrinsic motivators influence change (Vallerand & Lalande, 2011).

Social identity in education is related to self-esteem and motivation for change, which can be characterized within belief systems that students, colleagues, administrators, parents, and community members either positively or negatively reinforce (Bandura & Locke, 2003). To increase academic performance and promote a social change in educational systems, teachers need to ensure instructional practices take into

account individual learning styles across settings and classroom factors that include using data from a variety of informal alternative methods of assessment to design lessons based on student strengths and weaknesses (Corno, 2008).

Significance

Educating students in the 21st century requires developing a comprehensive picture of student learning that is not dependent on a label or diagnosis but on student strengths and weaknesses; it is also about formulating and testing hypotheses regarding what a student can and cannot do and understand why the student experiences patterns of strengths and weaknesses (Freeman & Miller, 2001). As a result, cognitive social learning theories and the use of differentiated instruction can provide important perspectives that may even lead to decreased special education identification rates while maximizing the potential of all learners.

The research supports that inclusion works when teachers have adequately prepared themselves for the learning environment and are sensitive to the challenges for themselves and students. By differentiating instruction with a variety of activities based on student learning styles along with formative assessments that provide prescriptive measures to preteach and reteach students with specialized instruction, it may be expected that reading comprehension will increase for all students.

Researchers recommend further study in the following areas: instructional practices that provide student and teacher autonomy; determination through preassessments of the individual characteristics that motivate the student for reading; and

identification of the student's prior knowledge and learning profiles (Guthrie, McRae, & Klauda, 2007). It is important for educators to differentiate instructional designs in response to an increasingly culturally diverse population. Teachers need to feel empowered to instill changes that increase their confidence and self-efficacy in the classroom (Amiot & Sansfacon, 2011).

Summary

The driving philosophy behind special education is that all children can learn. Effective teaching strategies and differentiated instruction can provide all students opportunities for social inclusion, friendship development, and increased academic achievement. Cognitive psychology and brain-based learning recognize how and why students learn. Student self-efficacy, motivation, and academic achievement are strongly correlated to the classroom environment and student-to-student and student-to-teacher relationships (Dweck, 2002). Differentiating instruction with the use of evaluative data and formative assessments should guide instruction that allows for a variety of activities that meet the learning styles of students and that offers preteaching and reteaching for struggling learners (Barnett, 2011).

Promoting inclusive environments for students requires a decision-making process that involves multiple viewpoints, increased understanding, and professional development. To overcome obstacles, educators may need to reconnect with how and why students learn and realign their own philosophies and biases to accept that there are many types of learners, and students may need different approaches with instruction.

Cognitive theories and brain-based learning have become instrumental in special education. They describe instruction as a process that taps into both implicit and explicit teaching methods and is reliant upon the cognitive development of students as well as their individual learning needs and styles (Dever & Karabenick, 2011; Jensen, 2005; Kazu, 2009; Smith, 2007; Sousa, 2009; Wagner, 2008).

The relationship between teaching strategies and student performance may explain the achievement gap between students with disabilities and students without disabilities. Student learning and motivation are dependent on instructional practices that differentiate based on individual student learning needs as well as provide students with self-determination skills to build a foundation for learning beyond content-specific curriculum (Clark, 2005).

Chapter 2 will provide a comprehensive literature review that focuses on the importance of differentiated instruction and serving students in the LRE. The literature review includes historical background and legal implications for using instructional practices to improve achievement for all students. The research examines the effect of inclusion with instructional practices and academic performance on MSA in reading, focusing specifically on whether or not students have a disability and the achievement gap between special education students and students without disabilities.

Chapter 2: Literature Review

Introduction

Effective teaching strategies and differentiated instruction allow students with disabilities opportunities to participate in the LRE, which enhances their academic achievement as well as their psychological wellbeing. This conforms to the philosophy behind special education that all children can learn. Nationally, reading state assessment scores in middle school have not increased significantly since 1992; at Grade 8 the average reading score increased by only one point from 2007 and four points from 1992 (NAEP, 2011). In Anne Arundel County, Maryland, students' performance on MSA in Grade 8 has continued to decline for student with disabilities and has only moderately increased for students without disabilities, significantly increasing the achievement gap (Maryland State Department of Education [MSDE], 2013).

LRE promotes social inclusion and friendship development; students with and without disabilities benefit from inclusion opportunities (Reiss, 2004). Cognitive psychology and brain-based learning recognize how and why students learn. Student self-efficacy, motivation, and academic achievement are strongly correlated to the classroom environment and to student-to-student and student-to-teacher relationships. Inclusion and LRE success are dependent on instruction and the collaboration of special and general education teachers. Students need to be academically challenged, taught self-determination skills, and feel safe and protected in their learning environment. Promoting

inclusive environments for students requires a decision-making process that involves multiple viewpoints, increased understanding, and professional development

Social change is a process, not a product. Motivating social change in U.S. educational systems requires educators to reconnect and rethink how and why students learn as well as their own personal goals and expectations for the profession. A focus for social change in education must consider the global achievement gap between students with disabilities and their nondisabled peers. Federal laws and policies have established new guidelines for students with disabilities, such as NCLB (2002) and IDEA (2004). These mandates require educators to reexamine belief systems and instructional practices to benefit all types of learners. Special educators and general educators need to collaborate to uncover the unique and diverse needs of the students they serve.

Special education consists of three separate groups of students with significant sensory, cognitive, and physical disabilities. On December 3, 2004, President George W. Bush signed the Individuals with Disabilities Education Act of 2004, reauthorizing IDEA, which is designed to improve the academic performance of students with disabilities and introduce strict accountability measures to hold schools, districts, and states responsible for the academic results of students with disabilities. This law represents Congress's attempt to address the systematic problems with serving students with disabilities and academic standards outlined by NCLB (2001). Both NCLB and IDEA (2004) are intended to bring students up to the highest level of academic achievement; however, the struggle to blend these statutes causes stakeholders to

consider changes to the process of special education and charges educators to develop IEPs that provide all students a free appropriate public education (FAPE) based on each child's individual needs.

With a focus on compliance and bureaucracy rather than academic achievement and social outcomes, the current U.S. system fails too many children with disabilities. In the state of Maryland, IDEA (2004), in combination with the state law known as the Code of Maryland Regulations (COMAR), monitors compliance and academic performance of students who have disabilities. Originally, IDEA included a commitment to pay 40% of the average per-student cost for every special education student. Until passage of the American Recovery and Reinvestment Act in 2009, which increased federal funding significantly, Congress was funding IDEA at less than 18% for students with disabilities (US Department of Education, 2006). Although funding is important for students who require extensive accommodations to access the general curriculum, needs vary with individuals, and instructional pedagogy must move into the 21st century with technology and instructional methods that have been transformed from a cognitive neuroscience framework to recognize that all children do not come to school with the same intellectual tools. Funding mechanisms continue to raise concern through the reauthorization of IDEA in which states will be given financial incentives for placement decisions. Not all stakeholders share a common language or a collaborative definition for the implementation of effective services or instructional methods that will meet the diverse needs of learners, and this has led to over identification of students requiring

special education services and a disproportionate number of children misclassified as having a disability and being misplaced and excluded from non-disabled peers. This can cause stigmatization and other long-term consequences for students (Ortiz, 2002). IDEA and NCLB (2001) caused educators to make a paradigm shift that moves education from a culture of compliance to a culture of accountability for results for all children. The Office of Special Education Programs (OSEP) is committed to Results Driven Accountability (RDA). Local educational agencies are held accountable through compliance procedures set by NCLB and IDEA that mandate monitoring school performance for students with disabilities. Compliance refers to IDEA program requirements. The current U.S. system places heavy emphasis on procedural compliance and less focus on how the requirements impact student learning outcomes and accountability for how instruction is delivered to meet diverse student learning needs, thus providing more accountability at local levels to ensure all students are learning based student state assessment scores across all states and individual school jurisdictions. This is cause to provide a more balanced approach between compliance and program effectiveness, with the greatest impact being increased academic performance for students.

Teachers who foster self-esteem increase student motivation for learning (Ferkany, 2008). Teachers can enhance student belief systems and confidence by having an inviting student-centered classroom that is safe and free from harsh criticism. Student self-esteem is facilitated within the culture of the school and classroom environment,

which are interrelated with teacher practices and instruction. It is important for all students to believe they can succeed based on their own efforts (Geary, 2009). Learners construct knowledge from individual and social experiences, emotions, motivation, aptitude, beliefs, values, self-awareness, purpose, and meaning (Zurbriggen & Sturman, 2002). An increase in the perceptions of students, teachers, and others regarding the need to provide students with disabilities access to the general curriculum challenges educational systems to appropriately address the needs of students with disabilities and prepare them for higher standards.

Differentiated instruction is an active approach that uses preteaching and reteaching based on formative assessments to provide specialized instruction for struggling learners as needed through modified content, methodology, or delivery. It is an effective method of providing instruction that challenges all students to discover their unique interests and abilities (Klassen, 2010). Differentiated instruction acknowledges that all students bring their own versions of the world into the classroom, and all students do not learn the same way or at the same time. Classroom environments that model and instill acceptance for differences facilitate student engagement and enhance academic performance (Corno, 2008). Students demonstrate higher achievement when they are expected to meet their full potential and have a positive student–teacher relationship (Dweck, 2000). However, teachers often have negative beliefs and attitudes toward students with disabilities and do not hold the same high expectations for them that they hold for students without disabilities. This phenomenon is called the expectancy effect,

which is represented through instructional practices that do not extend to students with disabilities the appropriate academic challenges that enhance academic performance or require students to meet their full potential (Ferguson, 2007).

Research Strategy

Literature gathered for this review includes articles obtained from multiple sources such as books, journals, and government documents regarding student academic progress, response to intervention, inclusion, and the global achievement gap between students with and without special education needs. Online searches were conducted through the Walden online library in which Academic Search Premier, Education Research Complete, ERIC, and PSYC INFO databases were accessed using general search terms "differentiated instruction," "adaptive instruction," "learning disabilities," "academic progress in reading," and "teaching students in least-restrictive environments." Additionally, important information was obtained from the National Center for Educational Statistics (NCES); the U.S. Department of Education, and the National Assessment of Educational Progress (NAEP). There was not extensive literature regarding how inclusion opportunities and instructional practices bridge the achievement gap between students with learning disabilities and their nondisabled peers. A large amount of literature was descriptive regarding how classroom environment and teacher practices have a positive correlation to student self-efficacy that increases student achievement. Thus, the content of this literature review aims at identifying how instructional practices and inclusion may benefit students by using a universal design that

facilitates higher level learning for all students by differentiating instruction to increase academic performance for all students, whether or not a student has a disability, and which may actually assist in narrowing the achievement gap between special education students and students without disabilities.

Theoretical Foundation

Closing the achievement gap between students with specific learning disabilities and nondisabled peers relies on cognitive and brain-based social learning theories that suggest inclusion and differentiated instruction will narrow the achievement gap and increase student learning outcomes for all students (Klassen, 2010). Specific techniques and activities; such as the use of buddy systems, anchor activities, and technology; can accommodate students' differences, help students learn, and accommodate students' strengths and weaknesses in the general education environment (Corno, 2008). Major principles, guiding instructional practices, data collection, and progress monitoring are a result of IDEA (2004) and NCLB (2001). The psychology of education is concerned with predicting and providing explanations for students' academic achievement. Education is a dynamic system that continues to be a social system that functions to meet the needs of children and our society as a whole (Weiner, 2010). The concept of functionalism applies a theoretical perspective and an example of practical application that can be infused into real-life settings, such as the classroom, that promote student self-efficacy, motivation, and resilience, which are significant predictors of academic performance (Phan, 2009). Jensen's (2005) theory of cognitive neuroscience (brain-based teaching) and Bandura's

(2002) theory of self-efficacy highlight the importance of a multifaceted educational system that reflects all types of learners. Learning and behavior are a reciprocal interaction between the student and teacher that connect cognitive, behavioral, and environmental constructs (Bandura, 2002).

Schools frequently assess students due to compulsory testing programs as a result of NCLB. When students view assessment as a school or teacher mechanism for accountability, achievement is likely to decrease; whereas, when they view assessment as measures of individual student learning, achievement tends to increase (Diliberto, 2009). Student self-formative assessments have implications for teacher preparedness and instructional practices that consider what students need to know, what students learn, and how students learn and that place value with how instruction is delivered to increase student self-efficacy and academic outcomes.

The provisions of the law must consider the extent to which students with disabilities are provided a free, appropriate public education (FAPE); parent/student participation; an appropriate IEP; and the extent students are served in the LRE. FAPE is designed to ensure children benefit educationally from instruction and that the instruction meets the state's educational standards and approximates the grade levels used in the state's regular education standards.

The LRE not only involves special education students but encompasses the increasingly diverse student population of today. Students are all unique and bring their prior knowledge and background information into the learning environment. When

teachers provide autonomy in the classroom that supports individual students' interests, needs, preferences, and personal learning goals, academic engagement increases (Jang et al., 2010). Hence, educators need to be mindful of instructional strategies that implement curriculum with relevant and meaningful learning activities that provide optimal challenges for all types of learners, highlighting meaningful learning goals and providing moderate structure that result in higher student engagement. Teachers who do not provide enough structure or support hinder students from developing the prerequisite skills necessary for academic achievement (Jang et al., 2010). Instruction that is based on individual student learning profiles, learning preferences, interests, and needs fosters student engagement and increases academic performance (Phan, 2010). Students' affective responses, past learning experiences, and knowledge they bring to the learning environment guide teacher instructional methods and are positively correlated to student learning outcomes (Kazu, 2009). Academic performance is significantly connected to instruction and classroom practices designed to foster student self-esteem, motivation, and engagement in the LRE for enhanced academic performance (Nie & Lau, 2010). To ensure autonomy and structure, teacher practices should initiate learning activities with clear and detailed expectations, provide helpful guidance, and scaffold lessons to ensure all students are learning (Jang et al., 2010).

Academic achievement is dependent on student belief systems and feelings of self-efficacy that promote the positive effects necessary for retention and learning (Bandura, 2002). Geary (2009) suggested learning requires a multidimensional approach

to teaching. Studies of effective learning and teaching demonstrate motivation, engagement, and positive classroom climate enhance learning outcomes. To use delivery to promote social change requires emphasis on neurocognitive social learning theories of motivation. Cognitive social learning for motivation and social change relies on mental processes and belief systems that can facilitate change in the educational system. Ferkany (2008) asserted that motivation for change is dependent on belief systems and prior connections that may have induced positive or negative attitudes. Teachers' perceptions and expectations that all students should be expected to meet the same goals the same way will need to shift to differentiated instruction based on student ability, learning styles, and needs. Additionally, educational institutions need to realign with how and why students learn to promote a culture and social identity that values what teachers do and thus increase self-esteem and self-efficacy as a profession and community of professionals (Zurbriggen & Sturman, 2002).

Self-efficacy can lead to academic achievement for all students by redesigning instruction and the teacher's role, which is a crucial component for engagement, cognition, and academic success (Vallerand & Lalnade, 2011). Learning environments should be creative and flexible to maximize how students learn. Teachers who apply differentiated instruction understand the importance of using relevant and meaningful instruction as well as incorporating novelty into their instruction. Novelty is significant and can be accomplished by combining multiple models of instruction with the use of multisensory activities such as videos, art, music, and computer work that can be used as

accommodations for individual student learning styles (Phan, 2010). Developing an understanding of student differences fosters instruction to accommodate the similarities and differences (Barnett, 2011). Teachers who model acceptance and tolerance of the diversity of students are aware of activities that consider multiple intelligences as well as student strengths and weaknesses (Gardner, 1999).

Cognitive systems clearly indicate learning and change are related to motivation and self-esteem. Cognitive social learning theories support how significantly motivation and self-esteem contribute and are reflected in teachers' perceptions and their classroom management (Kazu, 2009). Theories of social learning on motivation suggest internal subjective experiences are related to beliefs, thoughts, and learning and explain behavior as the product of continuous reciprocal interactions that connect cognitive, behavioral, and environmental influences (Alpay, 2003).

Reading Comprehension and Instruction

To motivate educators to change instructional pedagogy implies that instructional designs need to facilitate learning goals with deep processing methods that consider how and why students learn that foster self-efficacy (Deci & Ryan, 2008). Guthrie, McRae, and Klauda (2007) found that reading comprehension increases when teachers use explicit learning strategies that incorporate a variety of classroom activities based on student readiness, interests, and needs as well as emotional relevance and also provide student–teacher autonomy that increases student motivation and engagement. Geary (2009) identified a theoretical perspective on what learning is and different approaches to

learning based on a multidimensional framework, including student-led instruction and different modalities that tap into students' individual learning styles that are reflected through their own experiences and backgrounds. The social cognitive theory proposes an evolutionary perspective of why learning may vary for children based on social needs and demands. Solheim (2011) found that students must be motivated to learn; students with low self-efficacy avoid challenging reading tasks and inhibit their learning opportunities, and this negatively influences their reading development. Smith (2007) found teachers often ignore the nature of how students learn due to parameters of curriculum organization and evaluative processes, which can affect students' learning. Finally, Barnett (2011) found that teachers need to use data to measure student strengths and weaknesses to inform instruction and that not doing so can ultimately affect student achievement. External restraints, such as state-mandated assessments and scores that dictate teacher ratings, can impede teacher self-efficacy and inhibit social change (Seifert, 2004). The social cognitive theory cannot explain low tests scores and has not prompted stakeholders to address teaching methods in a modern society.

Universal Design and Instruction

Promoting a UDL allows teachers to design lessons based on learner differences (Klassen, 2010). A concept that came from IDEA (2004), UDL requires teachers to anticipate student learning differences and then to plan instructional activities and methods that may differentiate processes, products, or outcomes (Wormelli, 2007). It incorporates a community of learners that recognizes different types of children and

different special needs. The main objective for an LRE is to provide a system of learning that identifies student weaknesses and then develops strategies to help the student learn (Klassen, 2010). Supporting inclusion requires a collaboration of all stakeholders (parents, administrators, districts, school boards, teachers, etc.) to support and incorporate learning opportunities for students with disabilities that uphold students' rights to be respected with dignity and accept the individual qualities students bring to the classroom to foster the educational potential of every student (IDEA, 2004). The teaching–learning process involves problem solving with a team of professionals who identify individual goals and objectives as well as strategies and interventions that will enable students with disabilities to maximize their learning potential.

Providing students LRE opportunities also requires ongoing measures that employ RtI, the practice of providing best practices of quality instruction designed to meet unique student needs. Additionally, it requires the use of formative assessments that direct instruction through progress monitoring that provides diagnostic data to inform instruction (Barnett, 2011). Corno (2008) explained that RtI is an intervention process that combines universal screening and collaborative problem solving and decision-making that directs adaptive teaching. Numerous factors are involved with promoting an inclusive environment for students with disabilities, and RtI is a team approach to a decision-making process with administrators, teachers, parents, and students to ensure students are placed in an appropriate setting for academic success. Research-based interventions have been useful through a tiered approach for identifying struggling

learners (Klassen, 2010). RtI recognizes some children need more support, so the level of intervention is tiered to give much to some students most of the time, less to others, and then more as needed. It involves selecting the appropriate instructional interventions that improve learning outcomes for all students (Barnett, 2011). Proving inclusive environments involves progress monitoring, student self-assessment, and ongoing assessments of student mastery that guide instructional decisions and delivery of content as well as collaborative planning with special and general educators to ensure proper selection of instructional materials to meet individual student needs. The core of instruction has therefore been successful by adapting instruction with necessary interventions, accommodations, modifications, and positive behavioral approaches accessible for all students based on the intensity of their need (Corno, 2008).

All students benefit when they feel accepted and hold positive beliefs toward their teacher. An LRE fosters socialization in school, which is a positive predictor for academic success dependent on the teacher–student relationship (Wentzel, 2002). U.S. students today are more multicultural and diverse, requiring teachers to reconsider their instructional practices to differentiate for students' individual learning needs. Students' academic performance is dependent on environments that foster self-efficacy and acceptance for differences, which is enhanced by instruction that applies student-directed activities that instill self-determination and responsibility for learning (Jang et al., 2010). IDEA (2004) has redefined U.S. educational philosophy so that it supports and recognizes best practices for serving students with disabilities along with nondisabled

peers. The reauthorization of IDEA requires that students with disabilities participate in and are assessed by standards set for the school population, and accountability for student progress is on the forefront.

Education and Students With Disabilities

All students have the right to an FAPE, and special education and an LRE provide that for students with disabilities, including through specialized instruction and related services such as speech or language that are designed based on individual student need. IDEA (2004) was instrumental to providing the full continuum of educational opportunities offered in the LRE for each student. It is the duty of all stakeholders to uphold the rights of students with disabilities, protect parents, and provide appropriate educational programs for students free from stigma or criticism (IDEA, 2004). To provide an LRE for all students, several objectives refer to how students are identified for special education and the placement process. Identifying a child with a disability is an ongoing process that may begin at birth and continues until age 20. All educators have the responsibility to respond to progress and interventions to ensure students are making annual progress toward specific goals and objectives as outlined in their IEPs (IDEA, 2004). The IEP should be specific and identify student strengths and weaknesses as they apply to educational impact as well as any related services the student may need that assist them to access the curriculum in the LRE. The IEP school team must work collaboratively with the student and parents to ensure equal footing and a comprehensive student program. Communication with parents offers the opportunity to partner with

schools to ensure students are receiving the most appropriate interventions and support in the LRE. Other considerations address confidentiality of information, procedural rights of parents and students, and transition activities that foster self-determination skills and postsecondary transition into adult life. Supporting the LRE for students with disabilities requires that special and general educators have continued opportunities for professional development and instructional coaching to enhance their instructional skills (Darling-Hammond, 2000).

The organizational culture, such as shared beliefs, expectations, and values, within a school environment create an open school climate that promotes inclusion and effective teaching practices (Weiner, 2008). Student-centered classrooms that guide instruction are based on student diversity and learning profiles that consider the best interest of the student and direct instructors to facilitate the learning process through strategic planning using a variety of activities, understanding content specific criteria, and conducting formative assessments that inform instruction and encourage differences while holding high expectations for all students (Ortiz, Flanagan, & Dynda, 2008). Cognitive psychology recognizes the teacher as a guide and validates that learning is the reciprocal interactions of teacher to student and student to student. Nie and Lau (2010) conducted a quantitative study in which some students were instructed with either a constructivist or didactic approach. The students who received a constructivist's approach to instruction were more motivated and engaged in the lesson. These students reported

that the learning was useful, relevant, and individualized. Student engagement is directly correlated to instructional practices (Deci & Ryan, 2008).

Inclusion practices and its' success is dependent on instructional practices and the use of differentiated instruction. Clark (2005) contended inclusion works for all students based on individual student learning needs as well as the intent to provide students self-determination skills that foster a foundation for learning beyond content-specific curriculum. Inclusion is a concept that has been drawing attention for several years based on the premise that students with and without disabilities can benefit from increased opportunities with each other (IDEA, 2004).

RtI challenges educators to rethink how and why students succeed. Instruction that is differentiated considers individual learning styles across settings and classroom factors and also uses data from a variety of informal alternative methods of assessment to design lessons based on student strengths and weaknesses (Corno.2008). Fisher (2012, p. 166) identified the ethics of teaching with a pedagogical obligation for stakeholders to come together and disclose their scholarly judgment and knowledge to inform instructional practices that provide students with an accurate picture of the content that fosters self-examination and reflection to encourage further learning. Educating students in the 21st century requires developing a comprehensive picture of student learning that is not dependent on a label or diagnosis but on student strengths and weaknesses; it is about formulating and testing hypotheses regarding what a student can and cannot do and then helping those who work with them understand why the student experiences patterns of

strengths and weaknesses (Freeman & Miller, 2001). According to the National Center for Educational Statistics (NCES, 2010) and the National Center for Educational Progress (NAEP, 2011), students with disabilities are not making significant academic gains compared to nondisabled student groups. The state of special education according to the NCES (2010) in accordance with NCLB (2001) all students were required to be proficient or advanced in reading and math by 2014. As the targets increase, students with disabilities are not making adequate growth to keep up with increasing Annual Measurable Objectives (AMO).

Originally intended as flexible instruments of learning, IEPs have evolved into written records of compliance with formal instruments and state and local academic assessments. Identification of learning and/or behavior disabilities has been significantly disproportionate to ethnic and English learners due to the construction of intelligence tests. Students have been labeled and placed in special education programs as well as alternative schools based on test bias and misuse (Ortiz, 2008). For example, students with sensory or physical deficits have been misdiagnosed and misclassified due to their inability to respond or attend to a specific test, causing concern for test misuse and potential bias. Students with special needs require highly competent professionals who uphold ethical practices to administer appropriate test accommodations and/or modification of the test (AREA, 2007 p. 102). The emphasis on prevention versus identification and eligibility of a disability must consider the role of teachers to provide adequate instruction and deliver respect for student diversity, culture, language,

economic, and ethnic backgrounds. IDEA (2004) and NCLB (2001) struggle to coexist balancing new demands for accountability, a need to safeguard pre-existing protections, and implementation of individualized education programs to increase academic performance for all students.

In the 21st century rethinking special education requires rethinking how and why students learn (Geary, 2009). Guthrie et al. (2007) found that reading comprehension and student progress is directly related to instructional practices that use explicit strategies with a variety of classroom activities based on individual student interest, need, and relevance and student–teacher autonomy. Solheim (2011) found that students must be motivated to learn; students with low self-efficacy avoid challenging reading tasks and inhibit their learning opportunities, and this negatively influences their development. Smith (2007) suggested that teachers who understand cognitive-based science and have an increased understanding of how students learn require continued access to training and education. IDEA (2004) must build on its previous support for equality and inclusion for all students, including reviewing and monitoring highly qualified teachers and professional development opportunities. RtI can be effective only if stakeholders strengthen the supports available to encourage quality programs for students, educational placements and services are determined on an individual basis, and instruction uses individualized approaches for all students to access the general curriculum. IDEA must continue to support states and localities with federal commitments to support and supply qualified teachers to all jurisdictions for recruitment and retention of teachers.

Educational systematic growth must empower educators to meet the diverse needs of students in rural and urban communities that incorporate initiatives for developing partnerships with federal, state, and local agencies as well as between schools and families. This is a major task given the diversity of classroom environments and a global economy that must reflect cultural heritages and accommodate different styles of learning and communication (MSDE, 2011).

Preteaching, Reteaching, and Formative Assessments

Data for educational purposes are often based on census information rather than actual students due to confidentiality issues, and special education is a sub-student group not disaggregated by achievement scores and disability, making it difficult to measure academic success with instructional practices with general and special education students (NAEP, 201I). Academic tests and state monitoring do not account for growth of individual students', only cohorts.

Positive outcomes are the ability to increase educational opportunities for students with and without disabilities. They afford the use of technical assistance to local schools regarding assessments, services, and placement. Emphasis is placed more on student learning than content, and students' motivation and self-esteem for learning increase (Dweck, 2000). The focus on instructional designs provides appropriate learning experiences for all students because it recognizes and understands the unique nature of each student. Corno (2008) supported this with her study on adaptive teaching in which there is a continuum from providing a high level of intensive instructional support to

students down to providing less support and direct instruction to others; the amount of support is driven by formative assessments that inform and/or modify the instruction. For example, some students have less background knowledge or lack exposure, so they may require more direct instruction with concrete models and motivational reinforcing. The role of the student in this case is developing cognitive processing strategies. The continuum then continues to modeling, guided practice, and independent learning, which could also be peer tutoring. The premise connects learning to self-regulation, a by-product of diversity in the classroom that supports the need for structure, support, and autonomy (Jang et al., 2010).

Preteaching and Reteaching Based on Student Performance

Students are:

- Grouped based on formative assessment data;
- Engaged in different instructional strategies based on their level of mastery (re-teaching, extension of anchor activities, etc.);
- Familiar with and readily move to designated areas for small group instruction;
- Engaged in a review of key components prior to the lesson (pre-teaching) if they have shown a lack of readiness of content; and
- Engaged in specialized instruction as needed through modified content, methodology, or delivery.

Summary and Conclusions

Major themes in the literature acknowledge Vygotsky's historical perspective in cognitive psychology that contends learning is an active process and a fluid reciprocal interaction of the student and teacher to facilitate the student's ability to construct meaning from multiple pathways. Sousa (2009) suggested brain-based research provides mental models for a multidimensional instructional approach that applies the importance of internal and external factors that involve accommodating and rethinking instructional methods to emphasize individual student cognitive learning styles, genetics, cultures, and experiences. The cognitive social learning perspective also contends designing instruction involves engineering effective classroom discussions; using planned strategic questions and total participation techniques; designing lessons that differentiate instruction; and, overall, observing, collecting, and using evidence of learning to make adjustments (Cash, 2011). Learner analysis often underscores the importance that it also should also promote student self-assessments that help students monitor their own learning so they will know what successful performance looks like, use personal learning traits, recognize the kind of effort that results in success, and be able to adapt their learning to achieve the desired goals and facilitate meta-cognitive strategies. Wormelli (2006) defined differentiated instruction as incorporating different methods for delivering instruction for different students to maximize learning and motivation.

Effective teaching and learning are related to educators' practices that model and instill positive self-concepts in students that increase motivation and academic

achievement. Learning experiences need to be designed for students based on readiness (pre-assessments, formative assessments), knowledge of students, and expertise with the curriculum, cognitive theory, and students at their stage of human development (Steifert, 2004). Brain based learning (Jensen, 2005) suggested complex learning involves multiple neural pathways; emotional attention comes before cognitive recognition. The reticular activating system (RAS) filters all incoming information. The most powerful learning factor is physical need. If the environment is high in anxiety, students looked bored, act out, or lack participation because affective filters are turned on (Wormelli, 2007). Internal and external factors contribute to how and why students learn. External factors include the physical environment, room temperature, peer support, and relationship with the teacher. Internal factors are based on the brain's ability to facilitate the learning process. These factors include engagement (goal-orientated attention and activity), repetition (priming, reviewing, and revising), input quality (capacity, pace, and amount of information), coherence (relevance and prior knowledge), timing (time of day and interval learning), error correction (mistakes, feedback, and support), and emotional states (safety and state of dependency).

Cognitive systems clearly indicate learning is related to motivation and self-esteem. Cognitive social learning theories recognize motivation and self-esteem are reflected in teaching styles as they reflect individual learning styles and student perceptions of the classroom climate (Kelly, 2008). Cognition and neuroscience suggest internal subjective experiences are related to beliefs, thoughts, and learning and explain

behavior as the product of continuous reciprocal interactions that connect cognitive, behavioral, and environmental influences. This chapter has discussed particular types of barriers and concepts related to how and why students learn, inclusion for students with and without disabilities, and differentiated instruction as an instructional methodology using pre-teaching and re-teaching based on pre-assessments and formative assessments to increase academic performance for all students. Furthermore, inclusion and differentiated instruction pertains to students with and without disabilities and issues as they relate to narrowing the achievement gap between special education students and students without disabilities with academic achievement.

The present study identifies the gap in the literature that relies on effective instruction, implying that the use of differentiated instruction may be a viable method to advance all students academically and afford students the benefits of being educated in inclusive settings with a special educator and general educator. Inclusive environments and differentiated instruction may offer the key to increasing academic performance and provide all students equal opportunities to demonstrate knowledge while accepting that all students do not learn the same way and may have inaccurate and inconsistent thinking models. Inquiring about what students know and asking them to make associations is also critical to increase their cognitive neural connections for learning (Jensen, 2005).Mental practice can improve actual performance (Jensen, 2005). Mental models, motivation, and self-esteem are additional variables that are correlated to classroom environments, student belief systems, and teaching practices (Sousa, 2009). The explicit nature of

teaching involves examining and developing learning-based instruction on student differences that encourage student motivation for learning (Ferkany, 2008). The social cognitive theory of motivation recognizes the importance of mental processes, the perception of how students learn, and self-efficacy, which is a function of personal belief systems and frames of reference. Motivation to foster a social change in the educational system relies on goals and expectations for success or failure. External factors are also important to fostering social change. Support and reinforcement from all stakeholders, as well as incentives from the environment, influence motivation and social change (Bandura & Locke, 2003).

Differentiated instruction, the use of pre-teaching and re-teaching based on formative assessments, considers how students learn and provides optimal conditions for the learning process (Corno, 2008). Educators do not teach the brain to think; they help learners organize information to enhance complex processing (Sousa, 2006). Teacher practices have a direct relationship to student motivation and engagement, and feedback is one of the greatest sources of intrinsic motivation (Jensen, 2005). Self-esteem is connected to the confidence and motivation children need to engage in and achieve educational goals and can and should be facilitated socially, that is, not only, or even primarily, through the interactions between teacher and student, but between student and the social environment of the school itself (Ferkany, 2008). According to Jensen (2005), brain-based teaching and cognitive social learning theories imply it is a process that considers the steps necessary before, during, and after class to increase academic benefits

for all students. Teachers with fluid mindsets understand all students can learn, and they create work to empower all types of learners (Sousa & Tomlinson, 2011). Bloom's Taxonomy is a perfect example of extended thinking that facilitates using all five senses to gather information from the environment, encouraging thinking and learning (as cited in Sousa, 2006). Using this knowledge and the revised taxonomy, teachers can creatively design the classroom to encourage both convergent and divergent thinking.

Social change requires motivation that is rooted in self-esteem and self-efficacy. Self-esteem is social in nature, and redesigning instructional practices requires a sense of self-worth and a sense of belonging to and acceptance by most educators to reinforce a change. As a consequence, teachers may stop differentiating instruction if stakeholders (educators, parents, administrators, specialists, and institutions of higher education) do not value effort and ability and there is no guarantee of success. Self-efficacy may require professional development opportunities to show what successful performance looks like, consider personal learning traits, recognize the kind of effort that results in success, and enable adapting their instruction to achieve the desired goals and facilitate meta-cognitive strategies**.** Educating students in the 21st century requires developing a comprehensive picture of student learning that is not dependent on a label or diagnosis but on student strengths and weaknesses; it is about formulating and testing hypotheses regarding what a student can and cannot do and then helping those who work with them understand why the student experiences patterns of strengths and weaknesses (Freeman & Miller, 2001).

Guthrie et al. (2007) found that reading comprehension and student progress are directly related to instructional practices that use explicit strategies based on individual student interests and needs, relevance, and also student–teacher autonomy. Solheim (2011) found that students must be motivated to learn; students with low self-efficacy avoid challenging reading tasks and inhibit their learning opportunities, and this negatively influences their development. Learning occurs when content is delivered in a way that fosters confidence and a sense of personal responsibility that engages and motivates students for reading (Smith, 2007). Hence, this theoretical perspective acknowledges the evolution of education that encourages a multidimensional approach to understanding behavior and recognizes the interrelatedness of the brain and environment is always developing and changing based on social demands and problems.

Future implications suggests that to reduce identification rates of students with disabilities, prevent students from being misrepresented, and narrow the achievement gap, requires a change in pedagogy and a paradigm shift to how teachers deliver instruction, as well as consideration of practices for differentiating instruction that address the unique learning needs of students in a multicultural, multimedia, and global economy. Teaching and pedagogical philosophy supersede content knowledge (Wagner, 2008). This is a major task given the diversity of classroom environments and a global economy that must reflect cultural heritages and accommodate different styles of learning and communication (MSDE, 2011).

The review of this literature has discussed research and literature connected to the research questions for the proposed study:

RQ1- Quantitative: Is there a significant difference on reading performance on Maryland State Assessments (MSA) for students when teachers use differentiated instruction?

RQ2- Quantitative: Is there a significant difference on MSA performance as a function of whether or not the student has a disability?

Gaps in the literature show how relatively few studies have provided data on these questions, particularly between special education and students without disabilities as it relates to instructional practices and reading comprehension.

Chapter three provides information on how this study was conducted, how participants were sampled including methodology, data collection, and how all the information was quantified, and will be analyzed.

Chapter 3: Research Method

Introduction

This section includes a description of the content and research methodology for this study. I describe the research design and approach; the setting and participants; the instrumentation, materials, data collection, and constructs; the data analysis; and the ethical considerations. The purpose of the study is to examine the effect differentiated instruction has on MSA in reading, whether or not a student has a disability. Differentiated instruction fosters a classroom environment that values individual differences (strengths and weaknesses), increases student independence and self-advocacy, and promotes engagement and motivation toward educational outcomes. Differentiated instruction allows for a continuum of support that ranges from low to high intensity and that easily moves between the two based on student need, always with the goal of student independence. Differentiated instruction circumvents student weakenesses through preteaching and reteaching that are based on formative assessments in which assignments and tasks are differentiated based on student learning profiles (Corno, 2008). Teacher practices that are absent of bias and embrace cultural diversity provide a positive environment in which students can maximize their strengths. Thus, teacher practices that promote differences based on the learning needs of individual students help to eliminate competition and foster collegiality (Ferkany, 2008).

The problem in Anne Arundel County, Maryland, is an 18% achievement gap between special education students and students without disabilities in reading

comprehension on the MSA for all levels of performance. The discrepancy of performance between students with disabilities and those without who are performing at the proficient level in reading is even larger at 32%. Since 2003, fewer special education students have performed at the proficient level, while students without disabilities continue to make progress. NCLB (2002) mandated that all students must reach proficiency on state assessments by the year 2014. Jang et al. (2010) suggested teacher practices that enhance student engagement and increase academic performance. Teachers who differentiate instruction provide instruction with autonomous support and structure that engage students in learning. Student engagement and motivation are correlated to academic performance.

Anne Arundel County's mission is to elevate the performance of all students and close all achievement gaps. In 2006, the grant specialist from the secondary special education leadership team wrote a successful grant application for funding to support differentiated instruction in all 37 secondary schools (grades six through 12). The grant incorporated the instructional coaching tool as a measure to gather and collect data which would be used as an evaluative measure to monitor the grants success. The Maryland State Department of Education recognized the instructional coaching tool as a valid instrument to assess and support differentiated instruction. In addition the tool was used to inform individual schools on their progress using differentiated instruction in cotaught classes. The grant provided funding to bring in two out-of-state differentiated instruction experts to provide professional development for teams of teachers in all schools.

Additionally, the grant afforded three opportunities for teams of teachers to attend national conferences on differentiated instruction as well as several county-wide conferences and school-based workshops focused on school improvement plans and strategic lesson planning. Schools have also received yearly stipends for substitute days that allow teachers to participate in instructional rounds, visit other schools, collaboratively plan across content areas, and participate in school-based professional development on preteaching, reteaching, formative assessments, and data analysis. The Anne Arundel County Board of Education, in accordance with the superintendent of schools, supports differentiated instruction and the work that has been invested for the last nine years as a strategic effort to close the achievement gap between students with and without disabilities.

The purpose of the study was to determine effects that cotaught classes using differentiated instruction (preteaching and reteaching) have on academic performance in reading on the MSA. The study also examines the relationship differentiated instruction may have with the type of student (whether or not a student has a disability) and academic performance. The study is based on 3-year trend data in which each middle school participated in school-based and county-wide trainings of differentiated instruction, coaching from special educators, and ongoing instructional site visits that provided individual school data to inform their instructional practices. The study used two methods for this research design. The first method examined MSA performance as a function of whether or not schools differentiate instruction. The second method examined

MSA performance as a function of whether or not students have a disability. The study used archival data collected over 18 months of classroom visits using the instructional coaching tool for 17 middle schools in the county. How frequently schools practice differentiated instruction was determined based on an averge of 72 classroom visits for each of the 17 middle schools. The mean average for all schools was calculated to provide baseline data of 31% for the frequency of use in the middle schools of differentiated instruction (pre-teaching and reteaching) in cotaught classrooms. The schools were delineated by those that exceeded the county average—these were considered to bedifferentiating instruction—and those schools that were below the county average, which were considered to not be differentiating instruction. Students who were identified as eligible for an educational disability and who received special education services according to an IEP were considered students with disabilties for the purposes of this study.

The study reflects archival data collected by the researcher based on classroom observations conducted by multiple observers from the secondary special education leadership team using the instructional coaching tool from September 2011 to January 2013. Eighth grade was selected since the majority of students continued in the same cohort from sixth to eighth grade. This subgroup of students was chosen to determine whether or not Anne Arundel County is making progress on their AMO in the eighth grade after 3 years of professional development, data collection, and individual school monitoring for their use of differentiated instruction.

Research Design and Rationale

The research methodology is a quasiexperimental design in a natural setting that examines the use of differentiated instruction (pre-teaching and re-teaching) and its effect on MSA performance in reading for eighth grade students with and without disabilities. The quasiexperiment uses an ex post facto design because the school setting has students who are nonrandom and scheduled in classes through standard county scheduling procedures. The participants in this case were students receiving instruction in cotaught classes who may or may not have received differentiated instruction. It was not predetermined which students would receive differentiated instruction. The research applied a quantitative approach to examine MSA performance as a function of whether students received differentiated instruction and whether or not students had a disability. The quantitative research used archival data collected over 18 months for 17 middle school cotaught classes. Thirteen trained educators conducted informal classroom observations using the instructional coaching tool, which was specifically designed to measure the frequency with which cotaught classes used preteaching and reteaching (differentiated instruction). Quantitative research was selected to analyze MSA data with differentiated instruction (preteaching and reteaching), a specific indicator on the instructional coaching tool over a span of 18 months.

The dependent variable for this study was MSA performance in reading for eighth grade. State performance standards use scaled scores in which students are identified as achieving basic, proficient, or advanced levels on the assessment. MSA data was

analyzed based on the number of students who scored proficient. The scaled scores were used to create cutoff scores, and performance was measured as the number of students at each achievement level. MSA performance was also aggregated among student subgroups to inform local school districts of their standard performance on MSA. Maryland collects student demographic data that identifies the percentage of students with and without disabilities on performance levels based on the state standards. MSA performance was calculated for 17 middle schools and represented as percentages of students scoring proficient in reading for eighth grade, use of differentiated instruction, and whether or not students had a disability. MSA performance data was also be used to show the achievement gap between special education students and students without disabilities. Data analysis demonstrated whether or not differentiated instruction affects MSA performance for students with and without disabilities.

The study had two independent variables, the first of which was differentiated instruction. Differentiated instruction is defined as using preteaching and reteaching (based on preassessments or formative assessments) to direct the use of specialized instruction that considers individual student learning styles, interests, and assessed content performance. Preteaching and reteaching allow the general educator or special educator in a cotaught classroom to group students, and they provide specialized instruction as needed through modified content, methodology, or delivery. This independent variable, differentiated instruction, was divided into two groups: (a) schools that were below the county average for frequency of using preteaching and reteaching

(not differentiating instruction) and (b) schools that exceeded the county average for frequency of use. The second independent variable was the type of student, or whether a student had a disability. This variable is categorical: students were either receiving special education services as determined by an IEP under IDEA (2002), or they were not. MSA performance in 2014 was analyzed, specifically examining the percentage of students who scored proficient with differentiated instruction and whether or not students had a disability.

The choice for this design was based on numerical achievement scores and a nominal scale that has been aggregated for each middle school based on its individual school data that shows the frequency percentage of implementation of differentiated instruction (preteaching/reteaching). Through MSA data the study also examined use of differentiated instruction and whether or not students had a disability. The data are representative of MSA performance-based percentages of students who score basic, proficient, or advanced for each of the 17 middle schools with type of student and use of differentiated instruction. The use of differentiated instruction may provide valuable knowledge in education regarding whether inclusion practices and differentiated instruction lend themselves to increased academic performance in reading, as monitored by the State Department of Education.

Research Questions and Hypotheses:

Research Question 1: Is there a significant difference on reading performance on MSA for students when teachers use differentiated instruction?

$H_0$1: There is no difference of MSA performance in reading as a function of differentiated instruction.

H_a1: There is a significant difference of reading performance on MSA as a function of differentiated instruction.

Research Question 2: Is there a significant difference on MSA performance as a function of whether or not the student has a disability?

$H_0$2: There is no difference of MSA performance as a function of whether or not the student has a disability.

H_a2: There is a difference on MSA performance depending on type of student, or whether or not student has a disability.

The analysis of MSA performance includes tables that report not only individual school performance by percentages of students who score basic, proficient, or advanced, but also data aggregated by type of student.

Maryland State Assessment Analysis and Data

The design for this study was selected based on school progress that is measured through the Maryland State Department of Education's 2013 Report Card for Anne Arundel County, Maryland. Both AMO and Adequate Yearly Progress identified that students with special education needs failed to meet target goals for reading. Maryland collects student demographic data to inform local school districts of the standard for performance among subgroups of students, which includes students receiving special education services. Data will be used to demonstrate use of differentiated instruction and

type of student as a function of MSA performance. Analysis of MSA data with use of differentiated instruction and whether or not a student has a disability will be used to determine if differentiated instruction helps narrow the achievement gap between students who have a disability and those who do not.

The NAEP (2014) allows individuals to compare subgroups of students across age groups for each state as well compare subgroups on a state-by-state basis. It separates level standards for the MSA into three categories: basic, proficient, and advanced. Eighth grade students performing at the basic level should be able to locate information, identify main ideas and themes, and make inferences from the text. These students have difficulty reading on grade level and are unable to understand the literature. Students performing at the proficient level are able to summarize main ideas and themes, analyze text features, and make judgments about the content. These students demonstrate reading proficiency that is on grade level. At the advanced level, students can identify and make causal connections that can be used to demonstrate understanding by supporting evidence and justifying the author's purpose with complex passages of information above grade level. The MSA is an annual assessment that tests Grades 3 through 8 in reading and math. All students should be performing at the proficient or advanced level (MSDE, 2013). Table 1 demonstrates the achievement gap between students with special education services and those in general education classes on reading MSA scores for Grade 8.

Table 1

Percentages of Grade 8 Student Scoring Advanced or Proficient on MSA Reading

School year	Special education students	Regular education students
2013	46.6	89.8
2012	51.9	87.5
2011	60.8	89.6
2010	53.5	87.4

Setting and Population

Participants in this study are teams of eighth grade teachers—a general educator and a special educator—who share classrooms and groups of students in 17 middle schools. For this study, 13 members from the secondary special education leadership team from Anne Arundel County, Maryland, including the researcher, conducted approximately 1,207 classroom visits between September 2011 and January 2013 to collect data. All data is electronically stored and aggregated for individual schools by the percentage for frequency of use each school differentiated instruction as indicated through pre-teaching and re-teaching. At each of the 17 participating middle schools at least three members of the secondary special education leadership team observed cotaught classes an average of 72 times (see Appendix A). All the data collected from the members was used to provide an accurate account of those schools that exceed the county average for frequency of use they differentiated instruction, 31%, and those schools that are below the county average for differentiated instruction.

Grade 8 student MSA scores in reading were chosen because all students are required to participate in the MSA. The assessments are submitted to the MSDE for scoring. The Anne Arundel County Board of Education and each individual school

receive the students' results. MSDE posts all assessment data on their website, and it is aggregated by individual schools, grade levels, and student groups, including students with and without disabilities. The researcher collected all assessment data for this study using the MSDE website.

The student population includes males, females, varied ethnicities, and special education students. The sampling design for choosing Grade 8 MSA data was a single-stage convenience sampling, which is appropriate given the large amount of accessible data (Creswell, 2003). Anne Arundel County has a large school population of 78,000 students. Middle schools comprise approximately 17,137 of the student population; 5,100 of those students are in the eighth grade, and 555 of those students receive special education services. The school district has both urban and rural areas, and districting is determined based on size and population.

Where students live determines the schools they attend. A small portion of students attend magnet and charter schools, which are based on a lottery system. Anne Arundel County is a diverse school system that serves many ethnic groups. The schools serve multiple subgroups of students including those receiving free and reduced lunch, eligible for special education services, and having limited English proficiency. All student assessments are submitted to MSDE, which reports scores back to each county. Anne Arundel County puts all scores into a computerized system that aggregates scores by individual schools, student subgroups, grade levels, and performance.

The Division of Special Education is a large structure within the Anne Arundel County Board of Education serving students from birth to 21 years old. The director of Special Education, the program manager for Compliance and Legal Issues, the coordinator of Birth to 5 Services, the coordinator of Specialized Instruction K-5, the coordinator of Secondary Instruction, the coordinator of Special Services, and the coordinator of Interagency and Nonpublic Placements head the division. Each coordinator has a team of specialists who assist with instructional designs and programming for students with disabilities. The Secondary Leadership team has 13 specialists who serve grades six to 12.

Reliability and Validity

The Instructional Coach Tool was originally piloted in Anne Arundel County by the secondary special education leadership team in 2006. It has undergone at least three revisions based on school and administrative feedback. A team of 13 special education experts and specialists from the secondary leadership team of the Anne Arundel County Board of Education developed the tool under the supervision of the coordinator for Secondary Instruction and Curriculum. In addition, all curriculum directors at the Anne County Board of Education have approved this tool as a reliable data source for instructional site visits for all county schools in Anne Arundel County. Initial piloting and subsequent revision over a 9-year period ensure its reliability and validity.

The Instructional Coaching Tool has 13 indicators specific to co-teaching classrooms and differentiated instruction. All members of the secondary leadership team

have worked collaboratively to define and provide consistency on what each indicator looks like in the classroom. It uses a 3-point nominal scale for data collection that each observer codes during a classroom visit as 1—observed, 2—not observed, or 3— not expected (not expected to observe during this part of a lesson). All data are calculated for each indicator and represented as a percentage for the frequency of use.

The team designed the tool to provide annual feedback to individual schools regarding their instructional practices and use of differentiated instruction in cotaught classrooms. The purpose of the tool is to give quantitative data to enhance academic outcomes for students with and without disabilities. All members of the secondary special education leadership team are experts on differentiated instruction, using the Instructional Coaching Tool, and analyzing the data to inform schools and administration on classroom practices.

The tool was a powerful vehicle used for all classroom visits conducted between 2008 and 2013 (see Appendix A). The team shared all visits and data with individual schools for individual school improvement plans and instructional changes. The secondary special education leadership team met before every presentation to a school to discuss and review the data. They compared data collected from team members to ensure reliability and validity. Each year, they conducted post discussions regarding use of the Instructional Coaching Tool and evaluated it to ensure reliability of the scoring for each indicator. They also assessed the validity of the tool annually based on school-based expectations and specific qualifiers that identified what each indicator meant. All

stakeholders (school administrators, content specialists, and special educators) defined and revised the indicators on the Instructional Coaching Tool (see Appendix A). The collaborative effort for reliability and validity took 9 years and ensured all schools and observers had received the same knowledge and practice using the coaching tool to provide consistency with rating and expectations of differentiated instruction. The Instructional Coaching Tool provided statistical data to all schools on the frequency of use for pre-teaching and re-teaching in cotaught classes.

To ensure the tool's reliability and validity in the study, administrators, lead teachers, special educators, general educators, and specialists from the secondary special education leadership team used the tool. The test–retest process supported reliability: multiple observers visited individual classes at least two or three times and conducted visits over an extended period of 18 months. The number of visits conducted to provide a statistically sound representation of the data supported validity of the tool. All middle schools received approximately 72 visits by a variety of observers to ensure data was statistically sound to provide a valid measure of the data collected. The Instructional Coaching Tool is a valid measuring tool only in that it measures what it is intended to measure and insomuch as the user understands and can identify the different aspects of differentiation in the classroom. If the user is well-versed in recognizing differentiation, the Instructional Coaching Tool is a valid tool that supports data collection, coaching, and professional development. The data that the tool collects can be considered both valid and reliable; however, scoring depends upon commonly decided descriptors to guide the

classroom observations. It is reliable in that it has given results that are consistent across multiple settings within a school and within the school district over the span of 9 years. The variable in the use of the Instructional Coaching Tool is not the data collection but the analysis of the data. The tool itself, when used with the descriptors and indicators, validly collects data and can be considered reliable from the consistent results that have come from observations over the past several years of implementation and use.

Materials and Procedures

The instructional coaching tool is an approved educational tool that Anne Arundel County implemented in 2008 to provide training, coaching, and professional development for co-teachers on differentiated instruction. It includes 13 indicators that assess co-teaching and differentiated instruction:

- both teachers are directing student actions and activities;
- lesson outcomes are posted in terminology clearly understood by students;
- lesson outcomes are periodically referenced;
- concrete models of content being studied are offered;
- teachers break down questions;
- teachers use a variety of strategies and activities to engage students;
- student mastery of concepts is assessed periodically throughout instruction (formative assessments);

- pre-teaching and re-teaching occur through specialized instruction based on student performance; assignments and tasks are differentiated based on student abilities;
- purposeful flexible grouping of students is observed;
- student self-assessment of progress is observed;
- available technology is being used effectively in instruction; and
- students are actively engaged in the instruction.

Middle school classes are 56 minutes long, and observers used the coaching tool for a minimum of one third of the class period; therefore, a visit would be a minimum of 20 to 30 minutes. In some instances classroom visits lasted for the entire 56 minutes. All visits were informal and unannounced. Classroom visits were conducted with a three- to four-person team from the special education leadership team that allowed for more than two observers for every school. All observers were assigned to a team in at least seven to eight different middle schools. The teams were randomly and purposely selected to increase reliability and validity with data collection. All schools received at least 72 classroom visits from September 2011 to January 2013. All data were directly obtained from cotaught classes in which a special educator and general educator instruct students across core content classes: language arts, science, math, and social studies. Data from the instructional coaching tool for each middle school were calculated as a percentage for the frequency of use. A 31% cutoff score was used to categorize whether or not schools differentiated instruction.

Independent and Dependent Variables

The independent variables for this study are use of differentiated instruction and type of student. Student type is a categorical independent variable—students receiving special education services with an IEP based on an educational disability (IDEA, 2004) and students without a disability. Differentiated instruction is divided into two groups: (a) schools that exceed the county average of 31% for frequency of use they pre-teach/re-teach (differentiating instruction) and (b) schools that are below the county average of 31% for frequency of use they pre-teach/re-teach (not differentiating instruction). The nominal data for this study will be calculated as a yes or no for differentiating instruction for each middle school based on school percentages for frequency of use and will be used to analyze MSA data based on percentages of students who score proficient on eighth grade reading. The independent variable will be measured on a nominal scale and defined as when either the general or special educator provides pre-teaching or re-teaching for struggling students based on a pre-assessment or formative assessment that requires a change with instruction based on individual student learning styles, interests, and assessed content performance. Students were grouped based on the formative assessment and were receiving specialized instruction as needed through modified content, methodology, or delivery.

For example, the teacher specialist (member of the secondary special education team) witnesses the use of an entrance ticket in which students then are grouped based on knowledge of concepts. This use of a formative assessment allows for a group of students

to have some pre- or re-teaching while other students complete another assignment to enrich their knowledge. In this case, using the Instructional Coaching Tool, the co-teachers would receive a 1 for observed. In another scenario, the observer may witness a teacher using thumbs up or thumbs down to indicate whether students understand the concepts but continuing the lesson without using this data to change or modify the instruction. In this case the score would be a 0 for not observed. In some instances, such as students taking a benchmark test, it would not be expected to see a variety of activities, so the observer records no score (not expected) for this part of the observation. Not expected scores are not calculated into percentages for frequency of use with classroom visit data.

The dependent variable in this study is performance on the MSA for eighth grade reading. Student scores are based on a continuous scale that defines values for each student score in reading comprehension with a minimum and maximum value. All students taking the MSA reading test are scored and measured against state standard values that use a scaled score with cutoffs based on performance standards that separate student performance into three categories: basic, proficient, or advanced. These scores will be aggregated by percentages of students for each school who score basic, proficient, or advanced. Percentages were also aggregated by type of student for all 17 middle schools. The percentages of students scoring proficient on the MSA will be analyzed with data from the Instructional Coaching Tool; whether or not students have a disability

determined the effect of differentiated instruction with academic performance. The research questions are listed below for review.

RQ1- Quantitative: Is there a significant difference on reading performance on MSA for students when teachers use differentiated instruction?

RQ2- Quantitative: Is there a significant difference on MSA performance as a function of whether or not the student has a disability?

Data Analysis

Quantitative data on differentiated instruction is archival data collected from September 2011 to January 2013 using the Instructional Coaching Tool (Anne Arundel County, 2014) for 17 middle schools. For this research, Indicator 8 on the Instructional Coaching Tool was used and calculated with a percentage for frequency of use individual schools differentiate instruction (pre-teaching/re-teaching) and compared to the county mean middle school average of 31% of frequency of use middle school cotaught classes differentiate instruction. Schools will be categorized as either exceeding the county average (differentiating instruction) or being below the county average (not differentiating instruction). Appendix B represents the mean middle school average on each indicator collected using the instructional coaching tool from September 2011 to January 2013. The special education data analyst aggregated all eighth-grade MSA performance scores for the last 3 years by type of student, whether or not the student has a disability, with the percentage of students scoring basic, proficient, or advanced for each of the 17 middle schools.

This study uses a research design that compares quantitative data from student performance on the MSA with archival data based on frequency of use of differentiated instruction and whether a student has a disability. This research design supports using a two-way ANOVA. An ANOVA was used for MSA performance data, use of differentiated instruction, and type of student. There are three assumptions when using a two-way ANOVA. First, the dependent variable is normally distributed for each of the populations as defined by the different levels of the factor; the variances of the dependent variable are the same for all populations; and the cases represent random samples from the population, and scores on the test variable are independent of each other. The dependent variable is based on a continuous scale: MSA test scores. There are two factors for the independent variable of differentiated instruction. Schools that exceed the county average for the percentage of frequency of pre-teaching/re-teaching and schools that are below the county average. The second independent variable is measured by category, whether or not a student has a disability. The third assumption relies on the independence of the observations between each group.

Data collection was obtained from archival data collected from the electronic Instructional Coaching Tool designed for Anne Arundel County. The Instructional Coaching Tool uses Excel software to calculate the percentages of frequency of use schools differentiate instruction from informal classroom visits conducted between September 2011 and January 2013. Data analysts from Anne Arundel County permitted the secondary special education team to input all data electronically; they then calculated

percentages for frequency of use on the specific indicator, pre-teaching/re-teaching, for each cotaught class. All data were calculated as school percentages for the frequency of use individual middle schools differentiated instruction. The software tool has the ability to aggregate data by individual school, observer, grade, and subject; it also allows for specific filters in Excel to generate reports based on specific criteria or a specific indicator on the coaching tool. All data obtained from the coaching tool for each middle school will examine use of differentiated instruction (pre-teaching/re-teaching) with performance on MSA in 2014 for eighth grade reading. MSA performance will also be analyzed by type of student. The achievement gap between students with disabilities and students without disabilities were examined with MSA performance and use of differentiated instruction to determine the effect differentiated instruction has on academic performance. The research questions and the hypotheses reflect this type of analysis.

Performance Matters is a software program also made available from Anne Arundel County Public Schools that enables MSA scores in eighth grade to be aggregated by type of student, whether or not a student has a disability. The two-way ANOVA was used to analyze MSA performance, number of students who score proficient for each middle school in Grade 8, use of differentiated instruction, and whether or not students have a disability. SPSS, a statistical software program for social sciences, was used to analyze the data. The two-way ANOVA compared the mean differences with MSA

performance (dependent variable) and the number of students scoring proficient with the two independent variables, differentiated instruction and type of student.

Results will be interpreted based on percentages of students in each middle school that performed proficient on MSA reading in Grade 8 for 2014. The results will be aggregated by whether students have a disability and compared statistically with individual schools use of differentiated instruction from data obtained from the instructional coaching tool.

Threats to Validity

Although trained raters for differentiated instruction completed all classroom visits, simply the observer's presence in the classroom can compromise validity. Another consideration is that teams of teachers in cotaught classes may have changed from September 2011 to January 2013. In other words, new co-team teaching pairs may have less experience with differentiated instruction. There is a potential threat for low internal validity due to the nature of the quasi-experimental design. It may be difficult to determine whether differentiated instruction was responsible for MSA performance in reading. Since student groups were not randomly chosen, it is difficult to rule out other factors that may be responsible for increased or decreased performance on MSA. It is possible a particular set of teachers had a better relationship with students, thereby increasing student engagement. Another scenario is that some classrooms had mostly girls.

External threats include making inferences that led to changes in teaching methods that are not accurate representations of a cause-and-effect relationship to student performance. A true experiment would have been preferred; however, due to the nature of this experiment and school setting variables, results would have been difficult to replicate across school settings, in this case different schools, creating a lack of generalization of results. Randomly assigning students in an educational setting and controlling for demographics is not realistic or feasible in a large school system. For example, many students move into or out of the county at different times during a school year. Standardization with school settings is difficult in social science research. Research for social sciences considers individual differences, such as experience, motivation, and psychological factors of the participants. Teachers reshape brains every day through instructional practices. Gaps in the literature continue to question nature versus nurture explanations that explain cognitive, psychological, and motivational factors for academic performance.

Ethical Considerations

It is not anticipated that this research could cause harm or pose any risk or danger to the participants. This study uses archival data that are public knowledge available to the entire school system. No specific school or teacher has been named. In addition, all MSA scores were calculated by descriptive statistics and scores, not specific students. The director of Special Education from Anne Arundel County Public Schools has approved this study and supports the research. It is anticipated that the results of this

study will be made available to educational leaders following dissertational approval from Walden's URB.

Ethical considerations for this study rely on the competency to adequately interpret the results and portray an accurate representation of classroom visits that ensures the research can provide inferences that can be generalized to the population being studied. This study is based on theory and knowledge of educational standards and practices. Data has been stored in a data system that only the researcher has access to. No specific co-teaching pairs were identified, and school names were kept confidential for the purpose of data analysis and discussion. For the purpose of moving Anne Arundel County Public Schools forward, all data from the instructional coaching tool have been formally shared with each middle school. All schools have access to MSA performance information that is provided through the MSDE through NAEP (2013). This research dispensed with informed consent procedures because it was naturally occurring based on normal educational practices, participants were not placed in any legal or economic hardships, and confidentiality as well as autonomy were protected (APA, 2010). This quasi-experimental model has been created with objectives-based research that comes from education. It considered cost effectiveness and cost benefit analysis. In addition, its purpose is to maximize benefits and minimize harm (APA, 2010).

Summary

The purpose of this study is to examine whether or not cotaught classes that use differentiated instruction (pre-teaching/re-teaching) and whether or not the student has a

disability affect MSA performance in reading. The study analyzes MSA performance with differentiated instruction and whether or not students have a disability to address the fundamental question of how educators can increase academic performance and narrow the achievement gap between students with and without disabilities so all students are career and/or college ready post high school. The research employs a quasi-experimental design that uses a two-way ANOVA for data analysis. It is hypothesized that differentiated instruction (pre-teaching/re-teaching) and type of student are functions of MSA performance for Grade 8 in reading. A descriptive quantitative research design using archival data will enable data analysis of statistical information. The study will use this analysis to determine causal relationships between instructional practice and student achievement on MSA reading.

The intent of this study is to advance education as a dynamic discipline and encourage educators to focus on a need for social change with instructional practices to close the global achievement gap between students with disabilities and students without disabilities. The findings of this study will address the impact of differentiated instruction and type of student as a function of academic performance. The interaction between differentiated instruction and whether or not a student has a disability may provide useful data that redirect educators from referring students through the special education process to a differentiated approach. In Chapter 4, I will present the data with analysis discussing the outcomes and impact of the research and hypotheses and main effect of the data.

Chapter 4: Results

Introduction

The purpose of this section is to present the results of the analyses conducted to determine if differentiated instruction and whether a student has a disability affects performance on MSA. The analyses were designed to answer the following research questions; Is there a significant difference in reading performance on MSA for students when teachers use differentiated instruction? Is there a significant difference on MSA performance as a function of whether or not the student has a disability? The hypotheses included in this study were:

$H_0 1$: There is no difference of MSA performance in reading as a function of differentiated instruction.

$H\ \alpha 1$: There is a significant difference of reading performance on MSA as a function of differentiated instruction.

$H_0 2$: There is no difference of MSA performance as a function of whether or not the student has a disability.

$H\alpha 2$: There is a difference on MSA performance depending on type of student, or whether or not student has a disability.

MSA is an annual assessment program that tests student skills and knowledge in grades three through eight in reading and math. MSA was a result of NCLB (2001) and was designed to monitor any existing achievement gaps among various student groups such as students without disabilities and students with disabilities. Differentiated

instruction in the middle schools was categorized as those that exceeded the Anne Arundel county average for the frequency of time cotaught classrooms preteach and reteach. These schools were examined with MSA performance for grade eight reading in 2013 for students with and without disabilities. I had access to the data from the instructional coaching tool as a member of the special education leadership team in the district from which the information was gathered. I was able to use archival data granted from Anne Arundel County Public Schools with MSA data to conduct a two-way ANOVA for data analysis, study results, and conclusions.

Data Collection

All data collected using the instructional coaching tool was collected between September 2011 and January 2013 for 17 middle schools from members of the secondary special education leadership team in Anne Arundel County, Maryland. In total, there were approximately 1,207 classrooms visited during this time frame. All data were electronically stored and aggregated for individual schools by a percentage for the frequency of use of differentiated instruction at each school as indicated by preteaching and/ reteaching. For each middle school, teams of three were assigned to visit and observe cotaught classes an average of 72 times (see Appendix A).

The student population included males, females, varied ethnicities, and special education students. The sampling for the design used the whole population of students in Grade 8 on MSA reading. Grade 8 MSA data was selected as a single-stage convenience sample, which was appropriate given the large amount of accessible data (Creswell,

2003). Anne Arundel County has a large school population of 78,000 students. Middle schools comprise approximately 17,137 of the student population; approximately 5,100 of those students are in the eighth grade, and 555 of those students receive special education services. The school district boundaries include urban and rural areas, and districting is determined based on size and population.

To examine the research questions, data from the instructional coaching tool was segregated by those schools that exceeded the county average of 31% for frequency of use of preteaching and re-teaching (differentiated instruction), and those schools that were below the county average (not differentiated instruction), with MSA scores for all students on Grade 8 reading in 2014. MSA data were also analyzed by type of student, whether or not a student had a disability, and their performance on MSA.

As discussed in Chapter 3 of this dissertation, this was a quantitative study that used SPSS, a computer program to analyze the data and compare mean differences of populations for the independent variables, differentiated instruction, and type of student with the dependent variable, MSA performance. This was a quasiexperimental ex post facto research design that compared the two independent variables with the dependent variable using a two-way Analysis of Variance (ANOVA). The ANOVA assumes each participant has scores independent of each other with the dependent variable. This study used two factors, whether or not students received differentiated instruction and whether or not the student had a disability, with MSA scores based on a quantitative dimension. The two-way ANOVA analyzed variances between the independent and dependent

variables and also examined the interaction between differentiated instruction and type of student with MSA performance in reading. MSA 2014, Grade 8 reading had approximately 5,090 students participate in taking the assessment. Of the 5,090 students, 4,161 (81.7%) scored proficient or advanced on the exam. Students with disabilities comprised 398 students among those who took the Grade 8 reading MSA compared with 4,922 students without disabilities who took the assessment. The researcher was interested in looking at how differentiated instruction and whether or not a student had a disability affected MSA performance in reading. The two-factor ANOVA design analyzed students' scores on MSA based on the two factors; whether or not students received differentiated instruction and whether or not a student had a disability. The main effect was analyzed by each level of the factors with the dependent variable, student scores on MSA performance. Observations within each population of groups are independent of each other, and each group has equal variances, and is normal. The two-way ANOVA allowed me to examine the effects of more than one independent variable in the same test.

Study Results

Seventeen middle schools were used for the study across Anne Arundel County, Maryland. The sample characteristics and variables were described with descriptive statistics: (a) schools that exceeded 31% for frequency of time they preteach/reteach (differentiated instruction), and (b) schools that are below the county average (not differentiated instruction). For categorical and nominal data, percentages were calculated

and analyzed with MSA results. Descriptive statistics were used to summarize, organize, and simplify data to compare outcomes between groups (Gravetter & Wallnau, 2008). To ensure the rights of all participants, the school name was not given, nor were student names; thus, this quantitative study did not affect the students or school in any negative manner. MSA results are shared on a public website by the Maryland Department of Education and a user agreement was completed and signed by the director of special education to use archival data from the instructional coaching tool for school data on the use of differentiated instruction. The IRB approval number is 05-05-15-0266343.

Descriptive Statistics

The following presents the results of a univariate analysis of variance conducted in which RDG Scale scores were predicted using differentiated instruction and type of student, whether or not a student had a disability. Table 2 presents descriptive statistics associated with this analysis. With regard to students who did not receive differentiated instruction, students with disabilities (M = 381.06, SD = 27.30) were compared to those without disabilities (M = 420.56, SD = 34.58). Among students who did receive differentiated instruction, those with disabilities (M = 383.60, SD = 26.24) were compared to students without disabilities (M = 422.66, SD = 33.17). Combining both populations of students on the basis of differentiated instruction and type of student results from the two factors were analyzed (M =421.68, SD = 33.89) for students without disabilities and for students with disabilities (M = 382.45, SD = 26.72).

Table 2

Descriptive Statistics

DI Status	Spec. Ed. Status	Mean	*SD*	*N*
Without	N	420.56	34.68	2272
	Y	381.06	27.30	180
	Total	417.67	35.71	2452
With	N	422.63	33.17	2650
	Y	383.60	26.24	218
	Total	419.67	34.29	2868
Total	N	421.68	33.89	4922
	Y	382.45	26.72	398
	Total	418.74	34.96	5320

The ANOVA incorporates a series of assumptions which were accounted for and tested as appropriate in this analysis. First, the ANOVA assumes an interval-level dependent variable, which was the case with regard to these data and illustrated through descriptive statistics and mean scores on MSA. The interval-level dependent variable was determined with a univariate analysis of student scores on MSA, differentiated instruction and type of student, and mean scores on MSA.

The ANOVA also makes the assumption of the homogeneity of variances, in which the variance in the dependent variable will not significantly differ on the basis of the independent variable category. This was tested in this analysis through the use of

Levene's test of the homogeneity of variance. This test was found to achieve statistical significance, indicating significant differences in the mean of the outcome on the basis of the level of the independent variables, indicating that this assumption was violated, $W(3, 5316) = 14.167$, $p < .001$.While the results of this test were found to achieve statistical significance, this assumption only impacts the choice of the post-hoc analyses conducted, if any (Howell, 2010). Therefore, this assumption remains irrelevant to the current analysis as both independent variables only incorporated two possible response categories, making any pair wise comparisons unnecessary here.

Next, the ANOVA assumes an appropriate sum of squares. The sum of squares is a measure of the total variability of the set of scores around the mean of those scores. A sum of squares is computed by first calculating the differences between each of the scores and their mean. These differences, or *deviation scores*, are calculated according to the equation. This assumption only becomes problematic in cases where there are no data for some cells, which was not the case with regard to the current analysis. Additionally, multivariate normality is also assumed in the ANOVA, which relates to the dependent variable having a normal distribution with respect to all categories of the independent variables. This was tested through the use of a box plot as well as histograms conducted on these data. First, the following *figure 1*, DI status and Type of Student*,* illustrates the distribution of the dependent variable separately on the basis of category of the independent variable. As shown, means were very similar across categories of DI status, (differentiated instruction) with means found to be substantially lower in cases of special

education students (SE status) as compared with other students. However, with regard to the distribution of the dependent variable, this appears to be relatively normal on the basis of this box plot with some outliers being found, especially in the case of non-special-education students with a positive response for DI status.

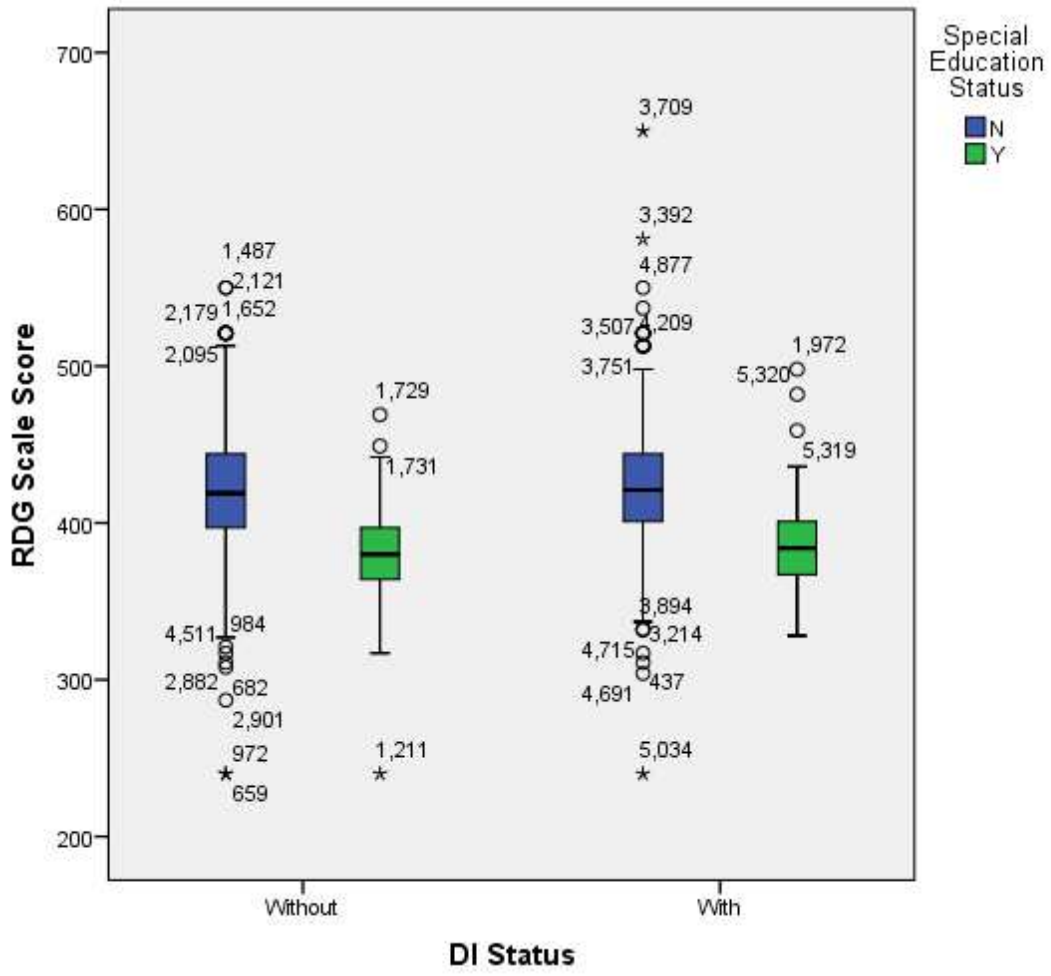

Figure 1 DI Status and Type of Student

The following two histograms, *figure 2*, DI Status and MSA Scores, illustrate the distribution of the dependent variable separately on the basis of DI status. As shown, in both cases, a normal distribution was indicated.

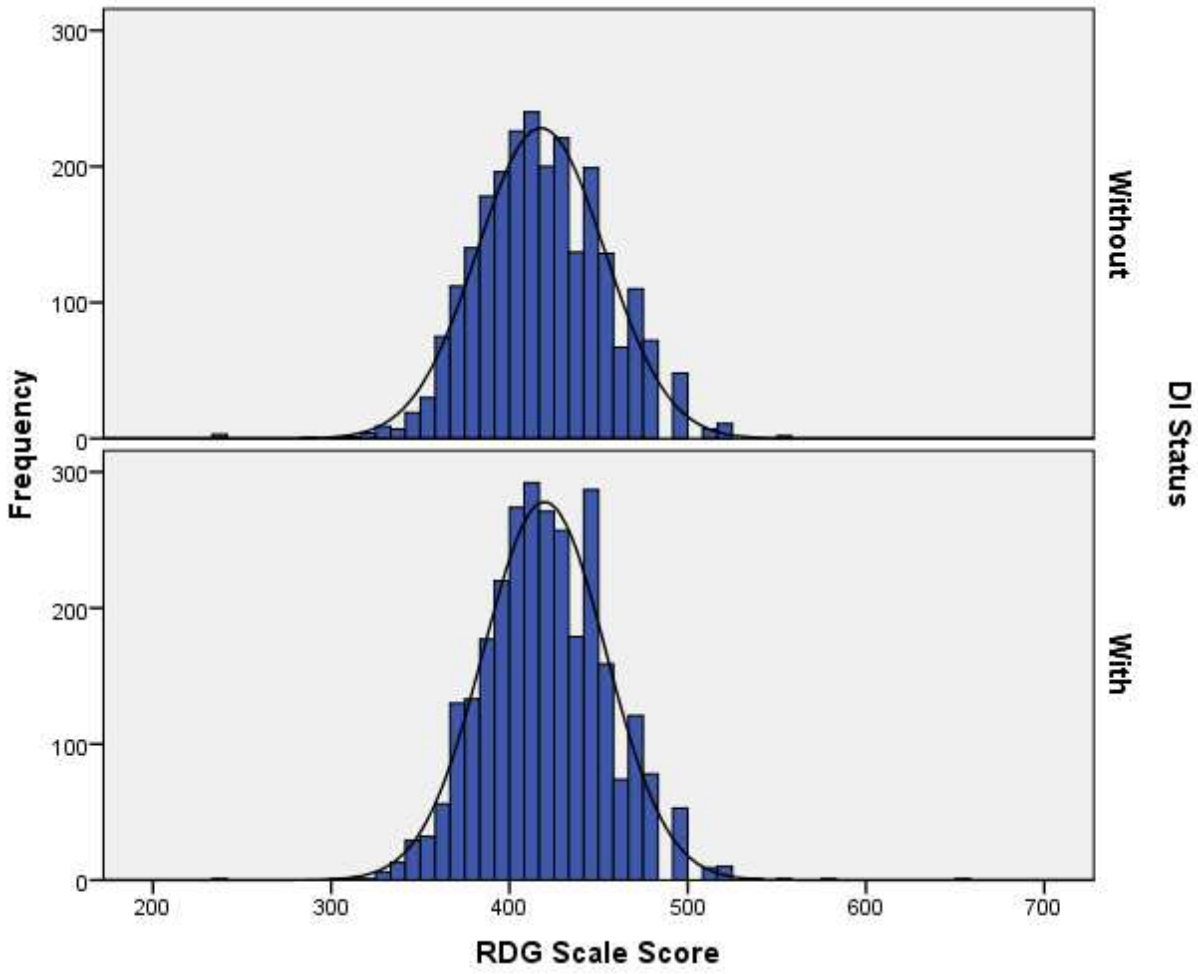

Figure 2 DI Status and MSA Scores

Next, the following two histograms, *figure 3*, MSA distribution of scores and Type of Student, focus upon the distribution of the dependent variable on the basis of special education status. As shown, a normal distribution was indicated in both cases,

while with regard to special education students, here, the distribution was found to have lower than average kurtosis.

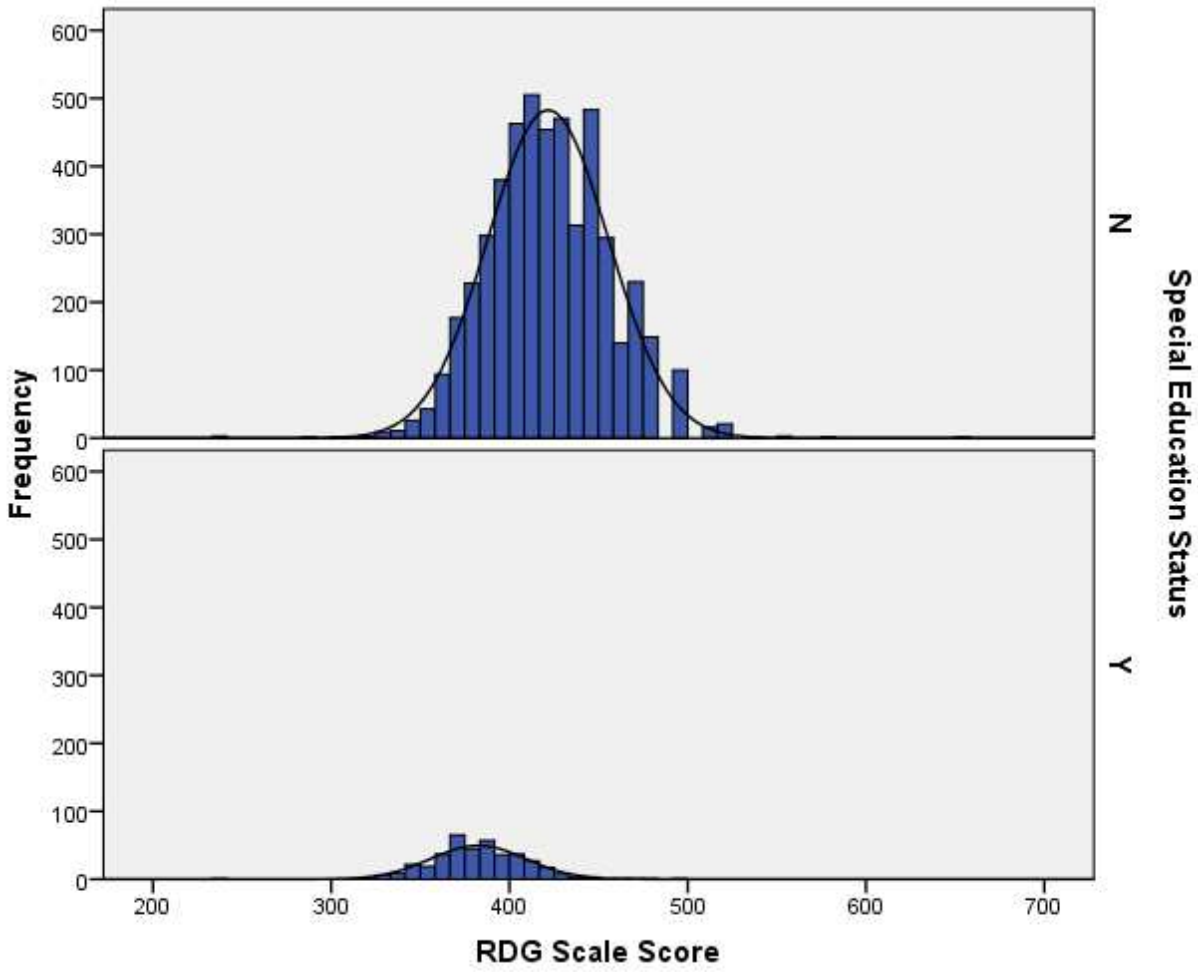

Figure 3 MSA Distribution of Scores and Type of Student

In the ANOVA, an adequate sample size is also recommended in order to decrease the possibility of violating the assumption of normality or the assumption of the homogeneity of variances. This study used population variance opposed to sample variance. Data was calculated using the whole population, thus this study used

population variance and population standard deviation. In this case the performance for all eighth grade students on MSA was analyzed as well as the performance based on whether or not a student had a disability. The population was based on total number of students, students that were non-special education, and students that received special education services. Additionally, equal or similar group sizes formed by the categories of the independent variables produce greater robustness with regard to these same two assumptions. While a largely unequal distribution was necessarily found with regard to special education status (398 versus 4922), a very similar distribution was found with respect to DI Status (2868 versus 2452).

Finally, the ANOVA also assumes data independence that was accounted for in this study by determining the strength of the association, if any, between the two independent variables. This analysis consisted of a phi coefficient, used to determine the strength of the association between two dichotomous measures, and was not found to achieve statistical significance, indicating the lack of violation of this assumption, $\varphi = .005$, $p = .719$.

Inferential statistics

Table 3presents the results of the between subjects effects associated with the analysis conducted. As shown, statistical significance was indicated only with respect to the effect based on type of student, whether or not a student has a disability. This result specifically relates to significantly higher scores being indicated among students without disabilities, $F(1, 5316) = 1.74$, $p = .000$. The main effect of differentiated instruction as

well as the interaction between differentiated instruction and type of student failed to achieve statistical significance, $F(1, 5316) = .02$, $p = .89$. There is not sufficient evidence to conclude that type of student and differentiated instruction contributes to higher academic performance on MSA. As indexed by eta² , the effect size was .00 indicating no effect. In addition eta² for whether or not a student has a disability and differentiated instruction with performance on MSA yielded a small effect however was not statistically significant.

Table 3

Tests of Between-Subjects Effects

Dependent Variable: RDG Scale Score

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
DI Status (Differentiated instruction)	1938.93	1	1938.93	1.74	.187	.000
SE status (Type of student)	562762.26	1	562762.26	504.58	.000	.087
DI Status * SE Status	20.13	1	20.13	.018	.893	.000
Error	5928989.901	5316	1115.31			
Total	939345813.000	5320				
Corrected Total	6501462.819	5319				

a. *R* Squared = .088 (Adjusted *R* Squared = .088)

Summary

The first research question: Is there a significant difference on reading performance on MSA when teachers differentiate instruction? Using a 95% confidence level and $p < .05$ significance level, schools that did not differentiate instruction had a

sample proportion of 76% percent variability for not receiving differentiated instruction and a sample size of 2,452 students who took the exam compared with sample portions of those students who received differentiated instruction with a 80% variability and student sample size of 2,868 students that took the exam. The analysis of variance failed to demonstrate a significant main effect of differentiated instruction and MSA performance. In addition, the only significant result was MSA performance for students without disabilities. The mean difference between those students that received differentiated instruction and those that did not was very small, $p > .05$. The null hypothesis is not rejected, and there is no significant difference in MSA performance when teachers differentiate instruction. The second research question: Is there a significant difference on MSA performance as a function of whether or not the student has disability? Summary data for this question was two-fold. This question identified the population of students with disabilities as 36% variability with a size of 218 students. Students without disabilities had a population proportion of 83% variability with a member size of 2,650 for students that took the MSA exam. Using a two-tailed test and a significance level of .05, the differential was 47% percent of variability yielding a statistically significant and large effect, rejecting the null hypothesis with $p > .05$. There is a significant difference in MSA performance dependent upon whether or not a student has a disability. When analyzing the data, comparisons were also conducted for whether or not a student has a disability and differentiated instruction with MSA performance. Although statistical significance was found related to MSA performance as a function of

whether or not a student has a disability the main effect of using differentiated instruction did not yield a significant main effect with MSA performance. Students without disabilities significantly scored higher on MSA than students with disabilities regardless of whether or not they received differentiated instruction. Results for use of differentiated instruction on MSA performance were not significant, failing to reject a null hypothesis that differentiated instruction did not make a significant difference for students with disabilities or students without disabilities. Therefore, there was no significant interaction effect between the use of differentiated instruction and whether or not a student had a disability.

The validity of this example may be compromised due to individual characteristics and whether or not groups are comparable to each other. The mean difference between the groups could be explained by the individual characteristics, not the treatment effect, which leaves room in the literature to expand on the research questions. The comparison of the performance for students that received differentiated instruction demonstrates a significant relationship that instructional practices affect academic performance with a .034 differential in group proportions, suggesting population variances are equal and $p < .05$. According to statistical analysis for all students in grade eight that took the exam, the only significant result that was found consisted of the fact that students without disabilities continue to make higher scores on MSA than same-age peers regardless of whether or not they receive differentiated instruction, particularly pre-teaching and re-teaching. Students without disabilities

significantly outperformed peers with disabilities on MSA in reading according to data analysis and there was only a small interaction, a 4.08% mean difference on MSA performance for students with disabilities that received differentiated instruction compared to those students with disabilities that did not receive differentiated instruction; however, this did not yield a statistical significance, $p > .39$. It is worthy to note that population variances may have affected these results as the population size for students with disabilities was 218 for receiving differentiated instruction and 180 for special education students that did not receive differentiated instruction, which may have impacted the statistical analysis. There was a .06% passing difference in those student groups who performed at the advanced or proficient level on MSA. 48.2% of students with disabilities that did not receive differentiated instruction performed at the advanced or proficient level compared with 47.6% of students with disabilities that did receive differentiated instruction.

This chapter focused on the analysis of MSA test results for reading in grade eight with differentiated instruction and whether or not a student has a disability. The sample groups were all students, students with disabilities, and students without disabilities, and the use or not of differentiated instruction, specifically pre-teaching/re-teaching. All data was archival and secondary sources were used to conduct this study. The null hypothesis that differentiated instruction does not impact MSA performance is rejected. The null hypothesis that performance on MSA is a function of whether or not a student has a disability was also rejected, in the data that students without disabilities outperformed

their peers when they received differentiated instruction. The caveat, however, pertains to students with disabilities in which the null hypothesis is accepted, although there was a small interaction for students with disabilities that received differentiated instruction and MSA performance, it was not statistically significant.

Chapter 5 will expand on the interpretations, conclusions, and recommendations based on this study. The literature supports differentiated instruction as a complex process and provides a variety of options to meet the diverse and unique needs of all students. It should be prescriptive in nature and diagnostic to ensure all students are learning (Corno, 2002).

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this quantitative study was to determine if differentiated instruction, preteaching and reteaching, had an impact on eighth grade students' reading scores on the Maryland State Assessment (MSA) and the significance of this finding as it relates to whether or not a student has a disability. Data from test scores of students that received differentiated instruction across 17 middle schools were compared with those students who did not receive differentiated instruction, whether or not students had a disability. The results of the data analysis showed that students who received differentiated instruction, preteaching and reteaching, did not yield significant results of improved performance on MSA. Students without disabilities yielded overall better performance on MSA with or without differentiated instruction compared to students with disabilities. In this section the results of the study are discussed. This section also includes social implications of differentiated instruction, conclusions, and recommendations going forward for future studies.

Interpretation of the Findings

The focus of this study was to examine how eighth grade students performed as a group to see if there was any improvement in performance for those students that received differentiated instruction and whether type of student had an impact on MSA performance. As a result, the main effect of differentiated instruction and whether or not a student had a disability was analyzed with student scores on MSA. Statistical

significance was only indicated as it corresponded to type of student, whether or not a student had a disability, in which students without disabilities demonstrated significantly higher scores and the main effect of differentiated instruction and the interaction between differentiated instruction and type of student did not demonstrate statistically significant differences in mean scores on the MSA. Students with disabilities and those students without disabilities had a very small mean difference on MSA performance with whether or not they received differentiated instruction. Students without disabilities out-performed students with disabilities regardless of whether or not they received differentiated instruction.

This study supports and extends the knowledge in the field of education for which effective teaching and learning require a multidimensional approach, and theories of learning co-exist and are not totally exclusive of each other. Construction of knowledge does not occur in a vacuum but is an integrated experience (Bandura, 2002). Mandated academic tests with state monitoring make it difficult to measure academic success because it does not consider growth of individual students' only sub groups of students identified within a cohort. Student motivation and self-esteem is also correlated with performance, hence students with low self-efficacy and learning disabilities often avoid reading tasks, which inhibit their learning opportunities (Solheim, 2011). Self efficacy and past experiences with learning are indicative for future learning, which are strongly related to educator practices that model and instill positive self-concepts in students. These, in turn, increase motivation and academic achievement through the use of

differentiated instruction for all students based on learning styles and need. Brain-based teaching employs theories of multiple intelligences and learning styles to provide a foundation for learning and perspectives to support the interrelatedness of perception, ability, and cognition in specific contexts and sociomental filters (DeGloma & Friedman, 2005). The adolescent strives to seek pleasure and positive reinforcement. Emotional messages guide their behavior, attention, and transfer of what they are taught into performance (Sousa, 2009). If the goal is for students to learn, then educators need to provide specialized instruction to activate neural networks in the brain that tap into implicit and explicit emotional learning and memory (Gregory & Parry, 2006).

The literature described in chapter two emphasizes the importance of student academic performance and instructional methods that consider the many factors connected to how and why students learn. There many variables that can be attributed to academic success and instructional methods, including individual teacher capacity to increase self-efficacy and self-esteem in students which foster and increase student's perceptions regarding their own competencies and strengths. Teaching students involves many facets that not only align to content knowledge but also increases engagement when students believe what they are learning is meaningful and useful (Bandura, 2002). To increase academic performance in students, educators need to consider how cognitive perceptions and prior experiences may influence their perceptions about learning as well as capitalizing on their strengths and accommodating for their weaknesses which can be done by differentiating lessons in a variety of ways; content, process, and product

outcomes (Wormelli, 2006). Educators may promote learning outcomes by providing a variety of learning activities that engage students based on student preferences, interests, and learning styles. Self-esteem is a manifestation of emotion that characterizes how individuals feel about themselves and their level of self-confidence, which have negative or positive behavioral consequences (Ferkany, 2008).

Mental models are the structures that aid in academic performance. It requires multidimensional approaches that incorporate knowledge of genetics; development of the male, female, social brain; and the impact of biology; and cultural and individual student needs in the classroom setting. Cognitive neuroscience, according to Jensen (2005) identifies mental models as the structures and internalized representations of knowledge. Mental models are also described as the neural connections involved with learning.

Hence, the conceptual framework provides a comprehensive account of academic performance and differentiating instruction that is based on student learning styles and interests to maximize achievement (Wormelli, 2007). Differentiated instruction and increased academic performance for students implies that teachers have the skills necessary to identify those students that may have inaccurate and inconsistent thinking models requiring specialized instruction. Inquiring about what students know and asking them to make associations increases their cognitive neural connections for learning new information (Jensen, 2005). Hence, mental models, motivation, and self-esteem are all correlated to classroom environment, student belief systems, and teaching practices (Sousa, 2009).

Ferkany (2008) contends that the cognitive social learning is based on beliefs and prior connections students have that induce a positive or negative attitude toward learning. Cognitive social learning theories have emphasized the relevance of integrating a theoretical framework of teaching and learning which not only require pre-teaching and re-teaching but promote student self-efficacy and motivation for what they are learning (Phan, 2009). Cognitive social learning theories not only emphasize the need to differentiate instruction but recognize how motivation and self-esteem are interrelated with teaching practices as they reflect individual learning styles and student perceptions of the classroom climate (Kazu, 2009).

The gap in this study pertains to students with disabilities and differentiated instruction. Although the data does not support statistical significance it poses additional questions as to how comparable the groups may be, causal variables that may impact results, such as gender, ethnicity and student exposure to the curriculum pre-test. The question remains with understanding the causal relationship between instructional practices, types of students, and bridging the achievement gap between students with and without disabilities. Geary (2008) suggests learning involves constructing a social learning environment that invites all students to learn which promotes classroom practices be designed to individual student learning styles, needs and progress. Cognitive social learning, according to Bandura (2002), supports the need to differentiate instruction because all students do not learn the same way or will reach the same desired outcome the same time. It relies on assessment and evaluative data to monitor student

progress and ensure students are learning and if not to re-teach in a specialized or different manner.

It appears more research is needed to determine educational impact of students with disabilities being educated in cotaught classes and whether or not they learn at the same or higher rate than being in a self-contained classroom setting (Friend, 2009). Scruggs, Mastropieri and McDuff ((2007) contend that co-teaching, a special educator and content specialist, demonstrated having a positive effect on student performance. Over twenty years ago Bauwens, Hourcade, and Friend (1989) proposed a rational for educating all students in a least restrictive environment a through service delivery model termed co-teaching. Bauwens et al. (1989) premised their research by defining an alternative educational approach in which general and special educators share teaching responsibilities and provide differentiated instruction for behaviorally and academically diverse learners in the classroom. According to Walsh (2012) who was the coordinator for special education in Anne Arundel County, Maryland during the 1990s and then relocated to the director of special education in Howard County, Maryland, the data has shown students being educated in cotaught classrooms perform significantly better on state assessments compared with students in similar general education classrooms without co-teaching (Walsh, 2012).

These findings may not explain the achievement gap between students with disabilities and their non-disabled peers but supports the survey research (Walsh & Conner, 2004) that there is academic benefits for students being in cotaught classes. The

survey research in Anne Arundel County indicated that students with disabilities being supported in cotaught classes enjoyed school more, and felt better about themselves compared to students being served in a self-contained special education setting (Walsh, 1992). Although the gap between students with disabilities and students without disabilities continues to grow, the research supports that performance of students with disabilities has improved at all school levels in Howard County, Maryland supporting the need for continued professional development in Anne Arundel County for implementation of the co-teaching model and differentiated instruction. Howard County research demonstrated a 22%increase for academic performance on MSA in grades 3-8 for proficiency in reading from 2003 to 2009 which was correlated with a 10 % increase of students with disabilities being placed in cotaught classes.

This research appears to support that creating effective professional learning systems bolsters teaching quality and student outcomes. Friend (2009) asserts that co-teaching is a much bigger picture than simply allowing students with disabilities exposure to the general curriculum with non-disabled peers, but serves a higher purpose for schools to support the implementation practices of teachers in these settings to promote higher achievement for all students. Co-teaching in Maryland has been recognized as a school system strategy for continuous improvement (MSDE, 2013) In addition, the Maryland Department of Education has developed a co-teaching network for school systems such as Anne Arundel County and Howard County to share co-teaching tools and strategies to

support system wide efforts beneficial for all district leaders, administrators, teachers, and students.

Limitations of the Study

The validity of the study must consider individual characteristics of student populations being studied. This study is retroactive in nature for groups were not randomly assigned, and populations may not be comparable. It is difficult to make a causal comparative analysis because the researcher was unable to manipulate the variables due to using a natural setting and a quasi-experimental design. Many factors such as students' exposure to differentiated instruction, teachers' expertise in differentiating instruction, migration rate of teachers, and changing student demographics are some factors that may hinder the trustworthiness of the data and results. The results from this study were not consistent with the findings in the literature in which showed differentiated instruction improves students' performance.

It is also important to note the sample size may have impacted the results of this study. The number of students with disabilities that received differentiated instruction was 218 compared to the 180 students with disabilities that did not receive differentiated instruction impacted statistical analysis. There was a passing difference of .06% for those students with disabilities that received differentiated instruction who performed at the advanced or proficient level on MSA compared to those students with disabilities that did not receive differentiated instruction, showing an interaction however unable to validate statistical significance but worthy to mention.

This quantitative analysis was designed to determine whether or not differentiated instruction makes a significant difference for students and consider implications for helping to narrow the achievement gap for students with disabilities and students without disabilities as well as increasing academic performance for all students. This quasi-experiment used a convenient sample logistically feasible within a school setting since cotaught classes are naturally embedded within the school environment. Students were scheduled in cotaught classes and in pre-existing groups in which the researcher had no control over. It is suggested that caution be used for interpretation since this design used a backward approach, data was archival and groups were chosen by pre-existing conditions. The validity of this study questions whether individual characteristics of the sample may have hindered results, not the treatment effect, suggesting continued research in this area for further study. Both the inability to manipulate variables and other possible causal factors support subsequent experimental research.

Recommendations

The study assumes all students receiving special education services in cotaught classes have current IEPs at the time the Maryland State Assessment was administered. It also assumed that students were given the accommodations and supports outlined in their IEPs. All students in this study received instruction in a cotaught class for Language Arts in grade eight. Neuroscience has provided a new perspective for educators regarding student behavior difficulties, such as maintaining focus, impulse control, and maintaining relationships with peers and adults. Instructors are the guides who facilitate the learning

process dependent upon strategic planning of both a general educator and special educator that requires both teachers are directing student actions and activities. Co-teachers are actively involved in leading instruction using a variety of activities, understanding content specific criteria, and conducting formative assessments that inform delivery of instruction for different learners while holding high expectations for all students (Ortiz, Flanagan, & Dynda, 2008).

According to Sousa (2009), understanding how the young brain's emotional and rational areas develop has significant implications for providing instructional interventions and strategies to increase academic performance. Smith (2007) concluded that student learning outcomes based on parameters of high stake testing in school districts overrides the need for teachers to base instruction on student individual needs and learning styles.

Universal design for learning (UDL) requires teachers to anticipate student learning differences and plan instructional activities and methods of engagement to differentiate process, product, or outcomes (Wormelli, 2007). UDL incorporates a community of learners that acknowledges there are different types of children with different special needs. The main objective for the LRE is to provide a system of learning that identifies student weaknesses, and then develops strategies to help the student learn (Klassen, 2010). The teaching/learning process involves problem solving with a team of professionals to identify educational goals, set objectives, and employ strategies that will enable students with disabilities to maximize their learning potential.

Differentiated instruction implies that teachers recognize barriers to learning, strategically plan, modify instruction, and use meaningful data to monitor student progress. Differentiated instruction is giving all students what they need to access the curriculum which may require specialized instruction that adds in technical supports and incorporates specialized instruction through not only pre-teaching/re-teaching but a multitude if interventions that builds upon students 'strengths as well as provides accommodations and/or modifications to enhance the learning process for all learners and increase overall achievement (Corno, 2008).

It is suggested that educators should avoid putting labels and diagnoses on students and simply design positive learning experiences that foster self-efficiency, motivation, and engagement through the use of pre-assessments and formative assessments to support strategic planning based on what students should know and be able to do (Wormelli, 2007). Preteaching and reteaching is based on student learning profiles which may also require specialized instruction that use multiple instructional formats, including such as small groups, partners, or individuals, as well as using a variety of instructional strategies based on learning preferences (Jang, Deci, & Reeve, 2010).

According to Nie and Lau (2010), students who receive a student-led instruction are more motivated to engage in learning because they view instruction as relevant, interesting, and important. According to Jang et al. (2010), engaging students in learning activities requires autonomy, support, and structure. Solheim (2011) found that students

must be motivated to learn; students with low self-efficacy avoid challenging reading tasks, which inhibits their learning opportunities and negatively influences their reading development. Redesigning how we teach students requires teachers to self-reflect and to reestablish their intrinsic motivation by identifying personal learning goals and setting student learning goals (McClelland, 1985).

Educational systems have a responsibility to students in terms of achievement and student learning outcomes. Although teachers reshape brains daily through instructional practices, gaps in the literature continue to support a nature and nurture explanation for learning and educational practices. In the twenty-first century, motivation is triggered by social media and technology that require a self-determination approach to promote social change in education. Students learn when they are motivated and engaged (Nie & Lau, 2010). This requires the use of technology tools and other resources, involvement with interesting and relevant projects, and learning environments—including online environments—that are supportive and safe. Motivation and instructional change suggests educators are given the tools and trained with technology as well as being collaborators in learning, consistently seeking knowledge, and acquiring new skills along with their students.

Hence, recommendations from this study suggests building collaborative partnerships with higher learning institutions, students, schools, and members of society that depend on academic institutions to prepare students with the skills, knowledge, and career paths that are consider student learning needs and interests (Corno, 2008).

Response to intervention challenges educators to rethink how and why students succeed. Instruction and differentiating instruction challenges educators to consider individual learning styles across settings and classroom factors that uses data from a variety of informal alternative methods of assessment to design lessons based on student strengths and weaknesses (Corno.2008). Fisher (2012) identifies the ethics of teaching as a pedagogical obligation for stakeholders to come together and disclose their scholarly judgment and knowledge to inform instructional practices that provide students with an accurate picture of the content that fosters self-examination and reflection to encourage further learning.

Implications

Implications from this study suggest effective teaching and learning may be more closely aligned with student motivation and use differentiated instruction which may look different for all classrooms and student learning profiles. To increase academic performance educators need to consider how and why students learn. Positive social change involves all stakeholders, (parents, teachers, organizations, students, and state departments of education); to re-align their philosophies and/or biases with a tolerance and acceptance that there are all types of learners and different students may require different things (Corno, 2008). Brain-based teaching employs theories of multiple intelligences and learning styles to provide a foundation for learning and perspectives to support the interrelatedness of perception, ability, and cognition in specific contexts and socio-mental filters (DeGloma & Friedman, 2005). If the goal is for students to learn,

then educators need to provide specialized instruction to activate neural networks in the brain that tap into implicit and explicit emotional learning and memory (Gregory & Parry, 2006).

To promote self-efficacy and academic performance in students, educators need to consider how cognitive perceptions influence learning of material (Wormelli, 2006). Educators can enhance learning outcomes by providing a variety of learning activities that engage students based on student preferences, interests, and learning styles. Self-esteem is a manifestation of emotion that characterizes how a person feels about themselves and the level of self-confidence that has negative or positive behavioral benefits (Ferkany, 2008). The big picture going forward to increase academic achievement depends on many factors; developing individual teacher styles that promote self-esteem, engagement, and self-efficacy, all of which foster and increase student's perceptions regarding their competencies and their beliefs that what they are learning is meaningful and useful (Bandura, 2002).

Cognitive neuroscience supports brain based teaching that recognizes emotional messages guide behavior, attention, and student performance (Sousa, 2009). Increasing student achievement involves many variables such as accessing prior knowledge, recognizing individual differences students bring to the class, and acknowledging the role genetics, culture, and experiences play before teaching something new in order for the transfer of information into long-term memory to foster meaning (Sousa, 2009). Providing relevant lessons with personal connections to real-life situations has been

shown to encourage students to use higher-level thought processes to increase neural activity and stimulate the brain for learning. Differentiated instruction assumes there are specific techniques and activities that can be used to accommodate students' differences in how they learn to help students access the curriculum such as buddy systems, anchor activities, and technology that can accommodate student strengths and weaknesses in the general education environment (Corno, 2008). The psychology of education continues to be concerned with predicting and providing explanations for students' academic achievement.

Education and student performance is a dynamic discipline within a social system that relies on its' functions to meet the needs of all children and our society as a whole (Weiner, 2010). It appears one commonality for educating all learners relies on the structures and supports educators instill to ensure all students have the pre-requisite skills necessary for academic achievement (Jang, Deci, & Reeve, 2010). Instruction that is geared based on individual student learning profiles, learning preferences, student interests, and needs, must all be a part of the learning process to foster student engagement and increase academic performance (Phan, 2010).

Recommendations going forward include a shared pedagogy from special educators and general educators that academic performance involves instructional practices that provide student/ teacher autonomy and individual characteristics that motivate students for reading through pre-assessments that identify prior knowledge and student learning profiles (Gunthrie, McRae, and Klauda (2007). Solheim (2011) found

that teacher knowledge of the learning process and the use of brain-based research can have an impact on teacher instructional practices and academic achievement. Teachers require professional development opportunities to increase their confidence and self-efficacy in the classroom (Amiot & Sansfacon, 2011). Our educational system is tasked with preparing all students with skills necessary to compete in a global economy. Learning goes beyond content-driven standards by differentiating instruction to meet the diverse learning needs of all students. Teacher interests and achievement are also positively correlated, which challenges teachers to rethink and examine their intrinsic motivators for becoming educators (Amiot & Sansfacon, 2011).

Conclusion

Differentiating instruction to increase academic performance implies a multi-model process that uses evaluative data, formative assessments, and a variety of activities, to that meet the needs and learning styles of students to engage and increase academic performance for all students (Barnett, 2011). Inclusion and LRE success is dependent upon instruction and the collaboration of special and general education teachers. Students need to be academically challenged, taught self-determination skills and feel safe and protected in their learning environment. Promoting inclusive environments for students requires a decision-making process that involves multiple viewpoints, increased understanding, and professional development for our educators. To overcome obstacles, educators continue to be challenged with student diversity and instruction that requires a process of instructing students that taps into both implicit and

explicit methods of teaching reliant upon the cognitive development of students as well as individual learning needs and styles (Kazu, 2009; Sousa, 2009; Jensen, 2005; Smith, 2007; Dever & Karabenick, 2011; Wagner, 2008).

Although this study did not conclusively confirm a statistical significance with differentiated instruction, pre-teaching and re-teaching, with academic performance it does not underscore the importance of further research to consider the relationship between teaching strategies and student engagement which may help to explain the achievement gap between students with disabilities and students without disabilities. Effective teachers encourage individual differences which guides their instruction (Ryan, 2006).

Response to Intervention (RtI) is the practice of providing high-quality instruction and interventions matched to student needs, monitoring progress frequently to make decisions about instruction or goals and applying timely and student-specific data to important educational decisions (Barnett, 2011) Effective core instructional programs, services, evidenced-based interventions, and positive behavioral approaches should be available to all students, and intervention resources should be accessible based on intensity of need (Corno, 2008). Student learning and motivation are dependent on instructional practices that differentiate based on individual student learning needs as well as provide students with self-determination skills to build a foundation for learning beyond content specific curriculum (Clark, 2005).

Professional learning that improves teacher's practices and student performance requires sustained and intensive professional development related to student achievement gains. Collaborative approaches to professional development can enhance school change that goes beyond individual classrooms. Other Nations that have outperformed the United States on international assessments recognize the need to invest heavily on professional learning opportunities for their teachers, build time in their school calendar for ongoing, sustained teacher development and allow for collaboration with other teachers within their work hours (NSDC.2009).

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Appendix A: Instructional Coaching Tool

Subject:
Total number of students in class
Number of students with disabilities in class
Percentage of students with disabilities in class
Both teachers are directing student actions and activities.
Lesson outcomes are posted in terminology clearly understood by students.
Lesson outcomes are **referenced periodically** throughout instruction.
Concrete examples and modeling of content being studied are offered.
Teachers **break down questions** when needed.
Teachers use a **variety of strategies and activities** to engage students.
Student mastery of concepts is **assessed periodically** throughout instruction.
Pre-teaching and **Re-teaching occur through specialized instruction** based on student performance.
Assignments and **tasks are differentiated** based on student abilities.
Purposeful, flexible grouping of students is observed.

Student self-assessment of progress is observed.
Available **technology is being used** effectively in instruction.
Students are **actively engaged** in the instruction.

Appendix B: Phase III Coaching Tool Feedback (Middle School)

	AACPS Phase III-MS Average Sept. 2011-Jan. 2013
Both teachers are directing student actions and activities.	**81%** **Range:** 54%-98%
Lesson outcomes are posted and reviewed in terminology clearly understood by students.	**91%** Range: 66%-98%
Lesson outcomes are referenced periodically throughout instruction**.**	**47%** Range: 31%-63%
Concrete examples and modeling of content being studied are offered.	**84%** Range: 66%-94%
Teachers **break down questions** when needed.	**93%** Range: 82%-100%
Teachers use a **variety of strategies and activities to** engage students.	**73%** Range: 59%-88%
Student mastery of concepts is **assessed periodically** throughout instruction.	**57%** Range: 22%-78%
Pre-teaching and Re-teaching occur through specialized instruction based on student performance.	**31%** Range: 7%-51%
Assignments and tasks are differentiated based on student abilities.	**33%** Range: 15%-46%
Purposeful, flexible grouping of students is observed.	**43%** Range: 16%-61%
Student self-assessment of progress is observed.	**29%** Range:

	11%-50%
Available **technology is being used** effectively in instruction.	**62%** Range: 42%-79%
Students are **actively engaged** in the instruction.	**78%** Range: 59%-89%